CHEMICAL MARKETS

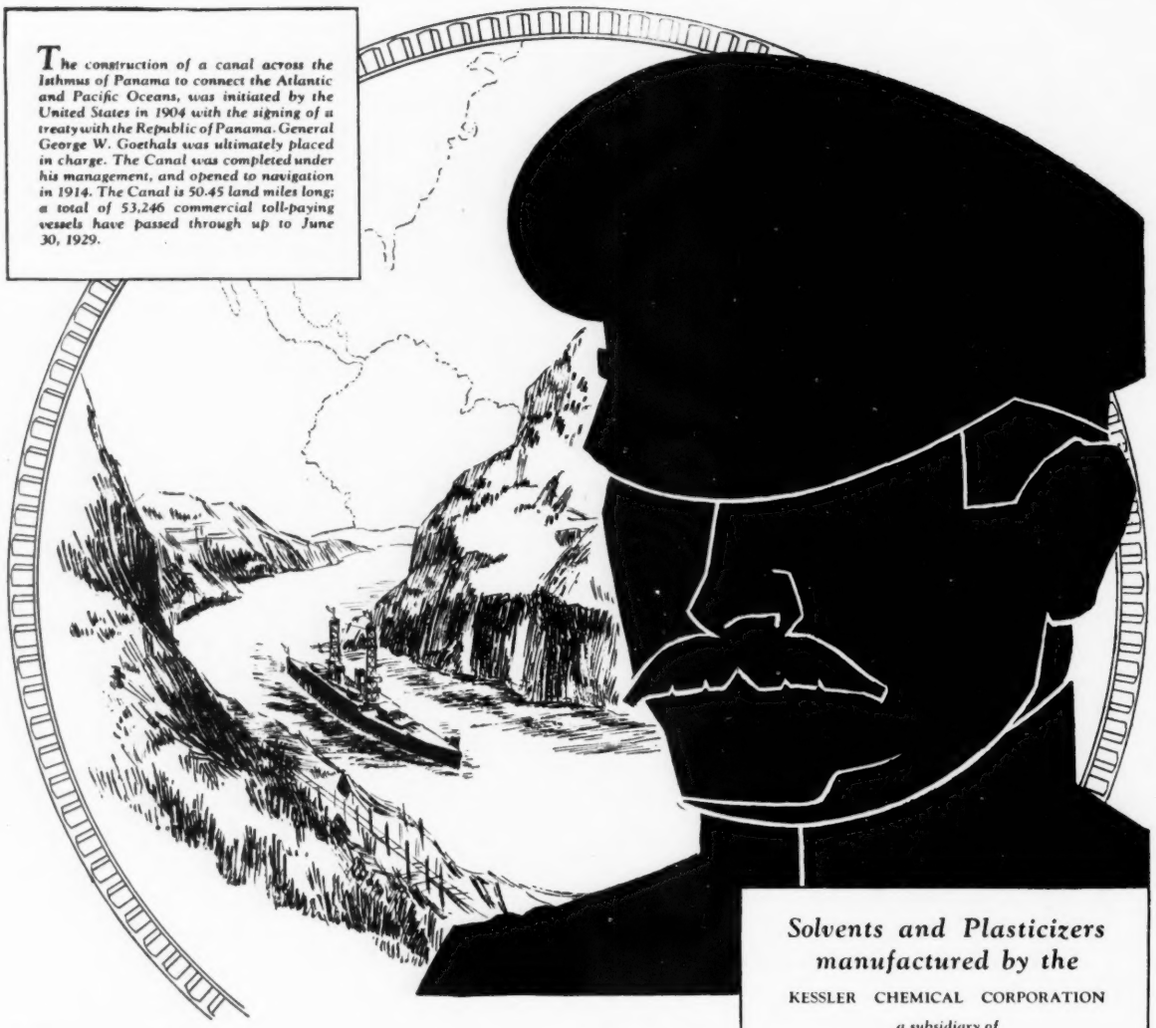
VOL. XXVI APRIL, 1930 No. 4.

The Senate's Tariff

WHILE there will be some heart burnings in chemical circles over the revision of the House rates in chemical tariff schedules made by the Senate, nevertheless, on the whole, Schedule One has escaped tampering most fortunately. No doubt this is chiefly due to the fact that a wholesome respect for the industrial and agricultural importance of chemicals exists in Washington.

BUT the administrative features of the tariff bill (which affect all schedules) have fared very badly at the hands of the upper House. The Senate has attempted to tie on to the tariff the pernicious proposal of debentures and they have so revised the flexible revisions that they are about as flexible as the Rock of Gibraltar. Both of these Senatorial proposals have drawn a storm of protest from business throughout the entire country. Fortunately there appears to be small chance of either passing, but they have created a situation rich in opportunities for political log rolling and still further delay.

THE tariff now in the making bids fair to stand in a conspicuous position in the history of our tariff legislation. Not only has it presented a most flagrant example of the evil effects of playing politics with economic legislation; but it will also initiate a radical departure from our proverbial tariff policy. In the defense of agriculture, for the first time in tariff history, highly protective schedules have been written on industrial raw materials. No one doubts that American agriculture needs assistance, but very few agree as to the most practical form this help should take, and in startling contrast to the chaotic farm situation, the continuous trend towards the more and more complete industrialization of our economic life is plain. Doubts naturally arise as to the wisdom in this switch in tariff policy, although the pressing needs of the present have apparently thrown far into the background any serious consideration of the future development of the country as a whole. It is a rare bit of irony that what proposed to be a few slight modifications in the Fordney rates—in order to bring them to date with changed economic conditions—should have resulted in such fundamental changes in the methods of writing a tariff and in the purpose for which it is written.



The construction of a canal across the Isthmus of Panama to connect the Atlantic and Pacific Oceans, was initiated by the United States in 1904 with the signing of a treaty with the Republic of Panama. General George W. Goethals was ultimately placed in charge. The Canal was completed under his management, and opened to navigation in 1914. The Canal is 50.45 land miles long; a total of 53,246 commercial toll-paying vessels have passed through up to June 30, 1929.

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This is number 16 of a series depicting historical periods in the development of America

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The Chemist's Future

Only in rare instances have our chemical executives been drawn from the ranks of trained chemists, and far from showing any tendency in that direction, it seems rather to have become increasingly difficult for the chemist to bridge the gap between laboratory bench and office desk. Undoubtedly, some incompatibility exists between technical skill and executive ability, but there are distinguished examples in our midst to-day which prove that these two qualities may be fused in the same person. It would seem, therefore, that the chemical industry has cause for complaint against the present aims and methods of our teachers of chemistry for their failure to attract and train men of the administrative type.

The brief for the plaintiff was presented in concrete fashion by Dr. Landis, in a recent address given before a meeting of the American Institute of Chemists. In expressing the reaction of the executive to the chemist and his work, Dr. Landis criticised the impractical nature of the training, the secrecy and mystery with which the chemist surrounds himself, and laid special stress on the distorted view the chemist has of the purpose of his work. According to Dr. Landis the chemist devotes ninety per cent of his efforts towards the destruction of capital, through minor process changes which save a small fraction of costs but in doing so render an entire plant obsolete. He pointed out that a greater proportion of the chemists' effort might more profitably be directed towards broadening the market for products already at hand.

Any chemist who attacked his work from this point of view would be far along the road to executive opportunity. This is the sales, rather than the laboratory, psychology. The present day finds the best executive material outside the chemists' group but out of such thinking, it is conceivable to produce a new generation of chemically trained chemical executives, despite the strong present tendency fostered by mergers under control of interests chiefly financial, to divorce technical and administrative control.

Organized Research

Our neighbor the Herald Tribune bewails the passing of the great inventor, and wonders sadly if the huge research organizations which have taken his place will not, sooner or later, destroy the good old Yankee habit of tinkering which has fathered so much of our inventive genius. We doubt it.

In no field has organized, directed, research played a more prominent part in progress than in our own chemical industry, and here certainly it is the child of necessity. The great mountain of scientific data which has been piled up during the past two generations is too great for any single mind to scale. The size and complexity of our commercial operations demand to-day the big corporation as their unit of production. On both sides, there is certainly a distinct personal loss. Initiative has become mechanized. Professional recognition and financial reward must alike be shared. But certainly the past ten years have seen greater progress in chemistry applied to industry than any previous period of similar time, and judged from the point-of-view of the greatest good for the greatest number, the modern type of research organization has produced astonishing results.

Nor is there any reason to suspect that the next ten years will not show an even greater progress in our industrial chemical development.

We Want to Know

It is very easy to understand why Dr. Doran wants to receive daily reports in quadruplicate on the quantity of ethyl acetate shipped with the names and complete address of the consignees. It is not quite so simple to learn by what authority he orders the manufacturer of this chemical to make these reports. And we are wondering if this authority extends to potato shipments—out of which excellent Scotch whisky can be made—or elderberry bushes, delivered by nurseries for the alleged purpose of ornamental planting; but extremely suitable for wine production ?

Quotation Marks

In your minds may be rising the question of the Sherman Act, the the Clayton Act, the Valentine Act, and so forth, but the business world and the entire country has learned that those laws have become obsolete. They may have fitted the times forty years ago. They don't fit the times of to-day and they should be properly modified. We have learned that the dominant interest in all business is the public interest, and the public interest is not served by conditions that give us peaks and valleys, prosperity and distress, in the fashion that we are getting it in the industry to-day.—*F. A. Seiberling.*

The new metallurgy is changing the courses of study at our universities, is revolutionizing the language spoken in foundries and heat-treating departments, is giving machinery and equipment salesmen something entirely new to offer, is creating new standards of service in difficult operations, is speeding up production and cutting costs in so many directions that the whole development is worthy of recognition as one of the most important changes taking place at this time.—*Canadian Chemistry & Metallurgy.*

Wide as the range of filtration processes already is, their application is far from being limited to their present uses. In existing fields the standards of efficiency are constantly being raised, and new industries are steadily being developed. The function of the filtration industry, therefore, is not merely to cater for existing requirements. It will be equally serving itself and the community by educating the public up to a higher level and introducing its operations to new fields.—*Chemical Age.*

If there is one implement for which the chemical engineer has prayed harder than any other, and which he is still very far from obtaining, it is the universal acid-resisting material. A consideration of constructional material occupies perhaps the largest part of his work, and the types at his disposal are as varied as are the multitudinous problems before him. —*Industrial Chemist.*

Organized research does not depend upon individual genius; it is a group activity, as distinct an activity as selling merchandise; it is as capable of organization and direction; so-called business methods are equally productive in its administration.—*Earl P. Stevenson.*

Reciprocal buying is a step backward toward the time when commodities were exchanged entirely by barter. Money is our well tried measure of commercial value and no better device has been invented. The desire of sales people to find new arguments to help sell their goods is everywhere evident and is commendable, but in the long run the sale will be satisfactory only if the reasons are sound. Fundamentally, the only sound basis for either purchase or sale is that the commodity, taking price into consideration, is the best for the intended purpose. Reciprocal buying contains an element not readily subject to measurement, making mutual advantage uncertain, and eventually leading to misunderstanding and dissatisfaction.—*Silicate P's and Q's.*

At the Eastman Kodak Company plant, in Rochester, N. Y., a committee of nine line and staff executives, with a chairman devoting his whole time, conducts a steady quest for more sales along three lines:

1. Expanding present uses of products to full market capacity.
2. Finding new uses for present products.
3. Discovering needs for new products, and devising such products.—*Chemistry and You.*

Progress in research may be measured by the fact that results throughout the world are now being published in scientific journals at the rate of about a hundred articles a day. No large and progressive industry is now without its research laboratory.—*Professor I. R. Daniels.*

Ten Years Ago

(From our issues of April 1920)

Frank S. Washburn, president, American Cyanamid Co., appeared before Senate Committee on Agriculture in opposition to bill appropriating $12,500,000 to enable War Department to operate nitrate plant No. 2 at Muscle Shoals for making fertilizer.

Tower Manufacturing Co. purchased from Marden, Orth & Hasting Corp. the M. O. & H. and Calco Chemical Co.'s plant, Newark, N. J.

Merck & Co. elected following officers: president, George Merck; vice-president, and treasurer, George W. Merck; secretary, Edward H. Green; second vice-president, J. W. Parry.

M. S. Orth resigned as president of Marden, Orth & Hastings Corporation.

Grasselli Chemical Co. declared a twenty per cent stock dividend.

Dr. C. L. Reese, chemical director, was elected a member of the board of directors, E. I. du Pont de Nemours & Co., Inc.

Walter S. Landis Asks

What Do We Expect of the Chemist?

NINETY per cent of the chemist's work is destructive of capital. Almost all his effort is directed towards revising and refining processes, which means scrapping invested capital and finding new capital. It is the chemist who is responsible for chemical developments, and it is up to him to cultivate a sense of proportion regarding the work he is doing.

Nobody questions that some scrapping is necessary, but in highly developed processes, such as we have in the chemical industry to-day, when a chemist changes some factor in the process, the savings are modest. Few of these changes save ten per cent, while for most of them, three or four per cent is high. Then another chemist comes along making this new change obsolete and again the investment must be scrapped and new capital secured.

Research and Plant Obsolescence

This is all destructive and the time and energy thus applied might well be directed into other channels. In the first place, the chemist should realize that after he is finished, after he has taken the raw material and made it into the finished product, the job is only about half complete. The money actually spent on raw material and labor to get the finished product, is only about half of the actual expense involved. Overhead and general expenses in a chemical plant amount to almost fifty per cent of the total cost so that when the chemist takes the product half way, the bookkeeper takes it the rest of the way. Yet almost ninety per cent of the chemist's efforts are directed towards destroying the comparatively high plant investment involved, through some slight improvement, which may save three or four per cent, but which possibly renders an entire plant obsolete.

More Time to Broadening Markets

The chemist should cultivate a broader idea of his purpose and his work. Much of this destructive energy should be directed towards finding new uses and new applications of the product at hand. He need not cease entirely his work of improving processes, but he should not let it continue out of proportion to its actual importance. The manufacturer has a product to sell and the chemist might well direct more of his efforts to sales promotion by finding new markets for this product. More of this ninety per cent of present activity on process should be shifted to the finding of new uses. A twenty-five per cent increase of production incident to the enlarging of the application of the products we know how to make by processes at least reasonably efficient will completely change most profit and loss statements. This is a greater economic contribution than the realization of a few per cent better efficiency in the use of raw materials. My thesis is to let our research pay more attention to the lines being developed by the various trade associations on expanding under use of products, and somewhat less to processes.

Another thing for which the chemist is himself responsible is the general aloofness which exists towards himself and towards chemistry. There is no single activity in which chemistry does not play

a part. It is at the bottom of everything, entering into food, shelter and clothing, so that it should really have close contact with people generally. Yet in any gathering of persons with assorted interests, the subject of chemistry is still largely taboo as a subject of general conversation. Chemistry is no more mysterious than mining, transportation or engineering, and yet it remains outside the pale of general interest.

Increasing Popular Interest

This lack of knowledge about and of interest in chemical activities may perhaps be traced to the ancestry of the present-day chemist. He retains a heritage of mystery from the alchemist who made everything complicated, chiefly to hide his own ignorance from the uninitiated. Even to-day, the chemist retains an unusual vocabulary and uses unusual terms, calling them "symbols." If he would call them abbreviations, and simplify his language generally he would be making a good start towards building up a more popular contact for chemistry.

Chemistry is also handicapped by its multitude of "secret processes." It is a subject of considerable speculation as to just how many really secret processes there are. I once had occasion to investigate methods for manufacturing a certain product, and in the course of this investigation, I came into contact with twenty-seven processes, all of which were "secret" and all of which were alike. It is a common experience to be excluded from a chemical plant, while in other industries, manufacturers visit each other and discuss their mutual problems. The task of the modern chemist is to remove the veils of mystery and secrecy which surround chemistry, so that the science, and the industry based upon it, may secure a better reception from the public and from other business and industry.

Research and Chemistry

"Research" is a word which slips glibly from the tongue since the discovery that all that is needed to sell chemical industry to the banker is a research laboratory. A room, a table, some glassware, and a chemist prepare the manufacturer to talk about his "research" laboratory. Practically everybody now has one. Nobody considers research a question of personnel. It has become a sales argument.

Chemical education does not seem to be giving sufficient training in the kind of research that is needed. The graduate of an engineering school knows how to test a bridge, and the young mechanical engineer knows how to test the steam generated in an engine. But the thesis of a graduate in chemistry is usually based upon researches connected with determining the boiling point of some odd, unknown compound, usually a hobby of the professor, and which has no place in commercial chemistry. It does not seem that our chemists are getting the right training when they are spending all of their time on problems so far removed from practical work. It would be of greater value to train our chemists in fundamental, routine work, which when they come out of the schools, might be applied to some advantage in an every-day job. Chemical education should strive to prepare the chemist for what he is likely to meet in common practice.

Practical Work Needed

Because college chemistry is so different from actual work, it also seems unwise to prolong the university course in chemistry beyond four years. Graduate work is a different matter, but for the majority of chemists who must earn a living, it seems useless to have them spend more time in school. Chemistry is such a varied science and touches so many things that the chemist cannot and should not be expected to master every branch. There should be more and earlier differentiation such as is the case with the engineer. Four years is long enough for a sound grounding in the fundamentals, while a lifetime is too short to learn chemistry in all its variations. Hence the chemist should get out into the field as soon as possible, and there really learn the job under modern production conditions.

The Filter Press

Rudolph Muspratt, last heir to the Muspratt baronetcy, and grandson of Sir Max Muspratt, of United Alkali fame, dies in Canada. The death of his twin brother preceded his by a month, while their father, Rudolph G., died last March, before the birth of the twins.

In addition to E. M. Queeny, who is serving on the board of directors, Monsanto has six other representatives serving on various committees of the St. Louis Chamber of Commerce. They are S. W. Allender, W. W. Schneider, J. A. Berninghaus, G. Du Bois, W. R. Phemister, and W. A. Vahle.

One of the signs of this Ultra-violet Decade is to be found in the advertisements of one of our swankiest nurserymen and landscape gardeners who includes among a list of clients prominent in the Social Register the firm of the Hoffman-LaRoche Chemical Works.

Lammot du Pont, president of E. I. du Pont de Nemours & Co., has announced the engagement of his daughter, Miss Natalie Wilson du Pont to George Phippen Edmonds, also of Wilmington. The latter is chemical engineer with the Bond Manufacturing Co.

Frederick M. Becket, technical vice-president, Union Carbide Co.; Stuart P. Miller, director of research and development, The Barrett Co.; and Foster Dee Snell are among the members of the newly organized American University Club.

Leonard A. Yerkes, president of Du Pont Rayon, is elected a director of the Seaboard Air Line Railway Co.

Hide to Leather

A primitive leather worker

Via the Chemical Route

SINCE the days when our early ancestors used sand and wood ashes in preparing the skins of animals for clothing, until the present day when close to one hundred chemicals totalling many thousands of tons yearly are consumed by the leather industry, chemistry has played an important part in leather production. Primitive man did not realize that when he used sour milk and various oils and fats, he was a pioneer in the use of lactic acid, neatsfoot oil and tallow in leather manufacture. And of course he could not foresee that in modern days the bichromates would replace his oak bark methods reducing the twelve-months' process to a twelve-day one.

The history of tanning goes far back into prehistoric times, being an even earlier stage of man's development than agriculture. The original process of curing skins was probably simply cleaning and drying. Later on, smoke, sour milk, various oils, and brains of animals were found to improve the texture of the skin. Even to-day the seal killed by the Eskimo is still skinned by the family, and the hide chewed into pliable material for garments by the women. But among primitive peoples it must be remembered that the leather was in but slight danger of decay or destruction by vermin, since the garment was in constant use. As civilization progressed, and man changed his clothes, better preservative methods became necessary.

Early American tanners piling hides and oak bark, layer on layer in the outdoor tanning vats
(Courtesy American Leather Producers, Inc.)

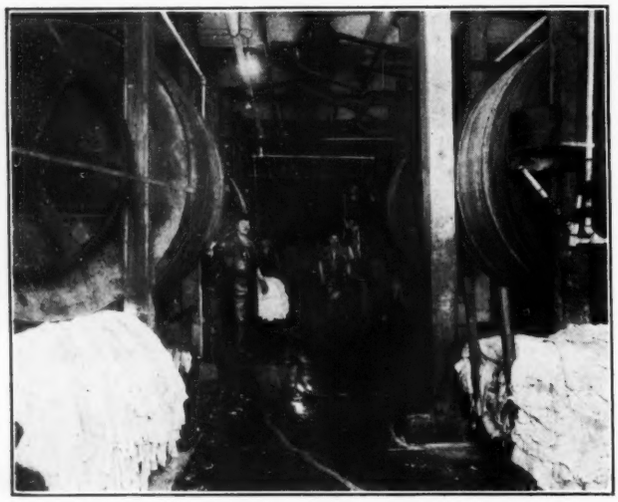
The first real tanning came with the discovery that certain astringent barks and vegetables caused permanent changes in skin textures and stopped decay. This knowledge

was possessed by the ancient Egyptians as shown by engravings on their tombs which depict the process of tanning. In China, specimens of leather over 3,000 years old have been discovered, and the Romans used leather tanned with oil, alum and bark. In the early centuries of Christianity, the Turks, the Russians, and the Hungarians were the best leather makers, while the Moorish invasions of the eighth century re-introduced the application of art to leather, bringing the famous Cordovan, Spanish, and Morocco leather.

Increasing Importance of Chemicals

Tanning was first established as a science during the eighteenth century and in 1790 lime was first used to loosen hair. The first recorded work on chrome tanning was by Knapp in 1856, but the first commercially successful application of the chrome tanning process was accomplished in the United States by Schultze in 1884. This process depends upon the fact that hydrated chromium oxide combines with the protein in the leather, making it insoluble. The tanning industry was revolutionized by this step and became dependent to a previously unheard of extent upon chemicals which now assumed a new importance in leather manufacture.

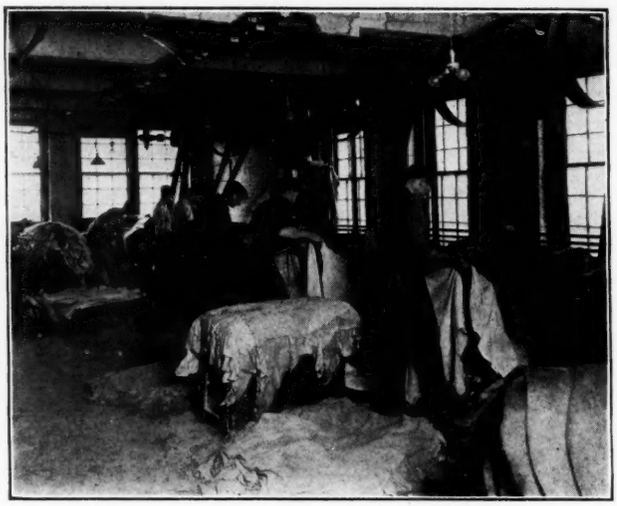
Since then, the chief developments have been directed towards the exact control of leather tanning,



Tanning drums used in the chrome tanning process
(American Leather Producers)

which is primarily a complex problem in colloid chemistry. This has resulted in a partial knowledge of the effect of various materials used in leather preparation, and in the development of various chemical materials designed to assist and ultimately to replace the vegetable tannins which have been used through the centuries. Thus it seems quite likely that the leather industry will continue to furnish a constantly growing market for the consumption of chemicals.

The raw material for leather production, hides of animals, occupies a unique position in that, although it supplies a very large industry, it is in itself almost entirely a by-product. Cattle, sheep, and hogs, whose skins and hides are used most widely, are killed primarily as a source of food. Hides come to the tannery as slaughter hides, fresh and untreated from the slaughter houses; and imported as wet-salted, dry-salted, and dried hides. Some are now frozen



Shaving hides, after liming and bating to remove surplus flesh and give them uniform thickness, before tanning
(American Leather Producers)

for delivery. In all these cases, the problem, of course, is to get the raw material to the tannery before putrefaction occurs—for short hauls no treatment is necessary, while longer transportation necessitates a preservative that will not interfere with the later manipulation.

At the tannery the business of converting the animal substance into leather starts with the removal of the preservative. Hides (pelts weighing 25 pounds or more when wet-salted), kips (15 to 25 pounds), and skins (pelts weighing 15 pounds or less when wet-salted) are treated very much alike in preparation for tanning.

Preliminary Treatment of Hides

Because leather can be made only from true skin substance, all dirt, hair, and scraps of flesh must be removed. Washing takes out dirt along with the preservative, and is done with water containing a little caustic or sodium sulfide. This is followed by the unhairing process. Formerly hair was loosened by allowing incipient decomposition to occur in the pelts; now the process is accomplished much more rapidly and under better control through the use of lime and sulfides. Knives attached to a revolving drum scrape off the hair which becomes a valuable by-product, used largely as a binder for plaster, also for hair felts, carpets, blankets, and other textile materials. Defleshing, in which superfluous flesh is trimmed away by knives on a revolving drum follows. The waste matter here is used to make gelatin and glue. Following this is the deliming operation,

making use of lactic, boric, acetic, formic, and hydrochloric acids to remove excess lime. Next is bating or puering, consisting of a treatment with pigeon or dog excrement, or more recently, synthetic mixtures easier to control, to open the pores and thus facilitate the penetration of the tanning liquors.

The Four Tanning Processes

Transformation to leather takes place through the operation of one of the following tanning methods:

Process	*Used for tanning*
1. Vegetable	Mainly sole leather, some upper leather
2. Chrome	Mainly upper leather, some sole leather
3. Combination	Some sole leather, some upper leather
4. Alum or alum-chrome	Pure white upper leather.

Vegetable tanning is the oldest of all, having been used in biblical times. It provides for actual combination of hide substance with tannins from vegetable growths. Principal sources are extracts made from hemlock bark, oak bark, chestnut bark, quebracho bark and wood, myrobolans, sumac bark, valonia, divi-divi, mangrove bark, wattle bark.

This vegetable process provides for exposure of the untanned hides first to weak extracts, then to stronger solutions, finally to full strength liquors. Heavy leather is laid away in vats, first a hide, then a layer of bark, and so on until the vat is full. Extracts are circulated by gravity or pumps, a very notable improvement over the old method of moving hides from vat to vat, and only possible in present-day large scale operations. Through chemical control, the middle portion of the hides is as thoroughly tanned as the outer surfaces.

Tanning with Chromium Salts

Chrome or mineral tanning is young, having been successfully introduced only about 50 years ago. It represents an American advance in the art of tanning, and is now used for the production of almost all of the upper leather made in this country, and a quantity of sole leather.

In tanning by this process, the hides prepared as for the vegetable process are commonly drummed or paddled in a solution of one of the chromium salts—usually a basic sulfate or chloride, or a two bath process may be used, in which the hides are first treated with a dichromate solution and then with a reducing agent like sodium thiosulfate. Contact with the chrome solution for from 4 to 8 hours is usually sufficient to tan a hide or skin, but a longer time of contact is customary, as a better piece of leather results.

After-Treatment of Leather

Because both vegetable and chrome tanned leathers have individual desirable properties, tanners now make some sole and upper leathers by a combination of the two processes.

When tanning is complete, hides are removed and thoroughly washed in warm water to remove all sediment. After thorough rinsing they are swabbed with oil, generally a cod oil or a mixture of this with mineral oil. After slow drying, subsequent treatment depends upon the intended use for the leather. Sole leather is rolled and compressed; belting and harness leather is treated with tallow, which adds to the strength and makes the leather more pliable. For grain leather, neatsfoot and cod oils, tallow, stearine, and soap are used.

Chemicals in Leather Dyeing

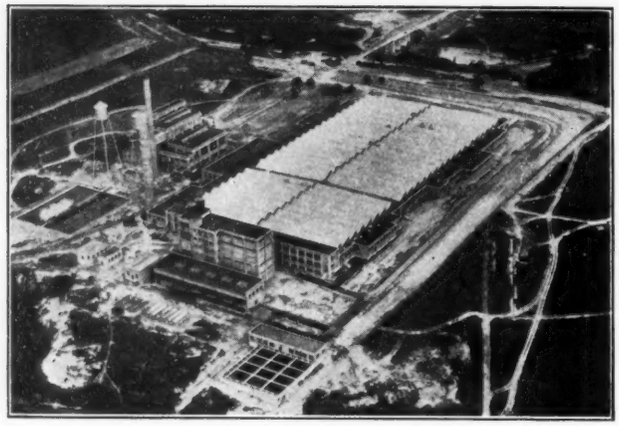
Dyeing is done either by coating the material with pigment colors, or for the better grades, drumming with vegetable or aniline dyes.

Patent leather is leather coated with nitrocellulose lacquers and boiled linseed oil.

Many skins are used in modern leather practise, including animal and reptile skins from all over the world, but the main outlines of the tanning processes do not vary.

Among the chemical and allied products used in leather technology, statistics for the more important are listed below.

Chemical	*Production (pounds)*		*Imports (pounds)*		*General uses*
	1925	*1927*	*1925*	*1927*	
Sodium sulfide	58,338,000	92,988,000	3,466,000	9,858,000	In leather as unhairing agent—for sulfur dyes—for rayon manufacture
Sodium chromate and dichromate	55,000,000	62,000,000	...	56,000	50% used in tanning
Sodium thiosulfate	48,000,000	33,000,000	171,000	23,000	Reducing agent in chrome tanning—antichlor
Lactic acid	not given	...	600,000	480,000	Bating, deliming
Formic acid	none until 1928	...	1,487,000	3,215,000	Tanning—dyeing—rayon
Alums	...	38,000,000	4,000,000	1,700,000	Tanning—mordant—water purification
Wool grease	4,000,000	7,700,000	9,000,000	9,000,000	Dressing leather
Chestnut extract	290,000,000	...	7,000,000	5,000,000	Tanning
Mangrove extract	4,400,000	...	2,700,000	884,000	Tanning
Myrobolans	4,400,000	...	330,000	645,000	Tanning
Quebracho extract	82,000,000	...	113,000,000	111,000,000	Tanning
Sumac extract	4,000,000	...	110,000	110,000	Tanning



Industrial Rayon Corp.'s plant at Covington, Va.

Our Oldest--- a

Chemical I

By L. B. Hit

Chairman of the Industrial Committee, Virgini

CHEMICAL industry is expanding into the south for three simple primary reasons. This expansion is obvious from a comparison of chemical manufactures in the United States and in the south over the last 15 years. The reasons are:

1. Advantageous location with respect to both raw materials and markets.

2. Greater stability of a native labor supply largely of rural origin.

3. Freedom from industrial congestion.

Certain plants have been influenced largely by a better supply of raw materials and labor. But no industry is entirely self-supporting, and others must follow, if only to reduce long hauls of esssential commodities. Take as a case in point the location of the new Stauffer plant at Roanoke, Va., creating a supply of carbon bisulfide which serves within a radius of 200 miles half a dozen rayon plants, using the viscose process.

Table I shows the distribution of chemical and allied products through the southern states on the basis of value as given in the Federal Census 1927. It brings out the extent and character of existing production, but its chief significance lies in the blank spaces which deserve individual consideration by astute industrialists. Some of these are blank, it is true, because statistics are not available to the public: others, because it is economically impracticable to produce the given item in that locality for reasons which will probably obtain permanently; but, the others are blank because (1) educated capital has failed to recognize rich opportunities awaiting intelligent exploitation, (2) super-conservative manufacturers are loath to "quit their ancestral domains" for new, and to them, distant sites, and (3) accurate data on resources and markets are lacking on which to base a decision.

The intent of Table I is primarily qualitative. Eight per cent of the total southern production of chemicals and allied products is not allocated, as shown under the heading "Other southern states." In addition there are one or two relatively important

TABLE I.

Value of Chemical and Allied Products in the South in 1927 (1)

No.	Product	Alabama	Arkansas	Florida	Georgia	Kentucky	Louisiana	Maryland	Mississippi
1.	Black, Carbon and Bone	.....	.....	.....	.....	.....	$7,162,968	.....	.....
2.	Chemicals, n.e.c.	.....	.....	.....	.....	.....	.....	$12,069,068	.....
3.	Coke, blast	$25,510,423	$1,471,414	.....	.....	.....	.....	.....	.....
4.	Cottonseed products	14,662,794	17,268,695	.....	$27,998,981	.....	21,338,810	.....	$27,978,008
5.	Explosives	.....	.....	.....	.....	274,836	.....	.....	.....
6.	Fertilizers	9,497,502	910,628	$14,807,376	22,093,903	.....	4,142,380	27,167,390	2,792,355
7.	Gases, liq. and comp.	713,619	.....	123,761	1,059,635	311,864	977,925	.....	.....
8.	Naval Stores	2,899,579	.....	13,499,130	18,065,937	.....	.....	.....	2,548,886
9.	Oils, n.e.c.	.....	.....	.....	*950,000	.....	.....	3,250,660	.....
10.	Paint & Varnish	1,002,408	.....	173,057	972,527	9,975,983	1,713,054	4,295,758	.....
11.	Paper	.....	.....	.....	.....	.....	15,518,937	11,325,129	.....
12.	Patent Meds. etc.	.....	177,224	1,117,597	3,967,290	658,312	1,350,310	12,452,551	.....
13.	Perfumes, Cosmetics	.....	.....	.....	535,160	.....	208,170	598,428	177,398
14.	Petroleum Ref'g	.....	12,725,342	.....	.....	8,246,366	138,249,752	.....	.....
15.	Pulp	.....	.....	.....	.....	.....	7,348,812	.....	.....
16.	Rayon (1929)	.....	.....	.....	*2,000,000	.....	.....	*8,500,000	.....
17.	Sulfuric Acid	943,749	.....	11,784	503,244	.....	35,118	2,971,449	150,244
18.	Tanning Mtls.	.....	.....	.....	172,218	.....	.....	.....	.....
	State Totals	$55,230,074	$32,553,303	$29,732,705	$78,318,895	$19,467,361	$198,046,236 (3)	$82,630,433	$33,646,891

(1) Federal Census of Manufactures, Washington, D. C., 1927.

(2) Production of "Other Southern States" is estimated by multiplying the total production in "Other States" as given in the Census Report, by the ratio of number of establishments in "Other Southern States" to number of establishments in "Other States." This method gives good checks with known data in general, and suffices for the qualitative purpose of this study. In each case the subscript numerals indicate the number of "Other Southern States" contributing to the figure shown.

*estimated.

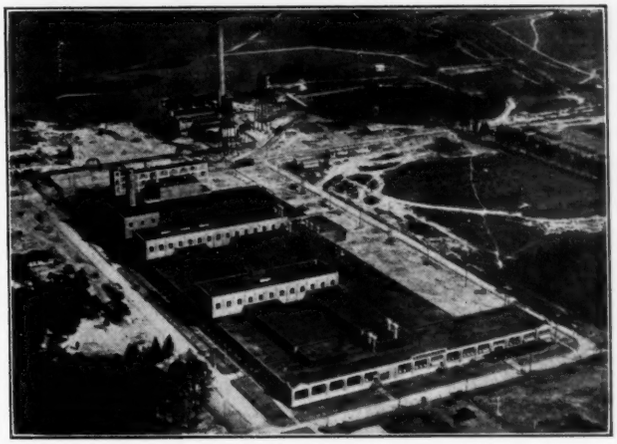
(3) Alcohol $17,000,000 and salt, $3,000,000 omitted here but included in Table II.

and Newest---

Frontier

Hitchcock

Virginia section, American Chemical Society



DuPont Rayon Co.'s Richmond, Va., plant

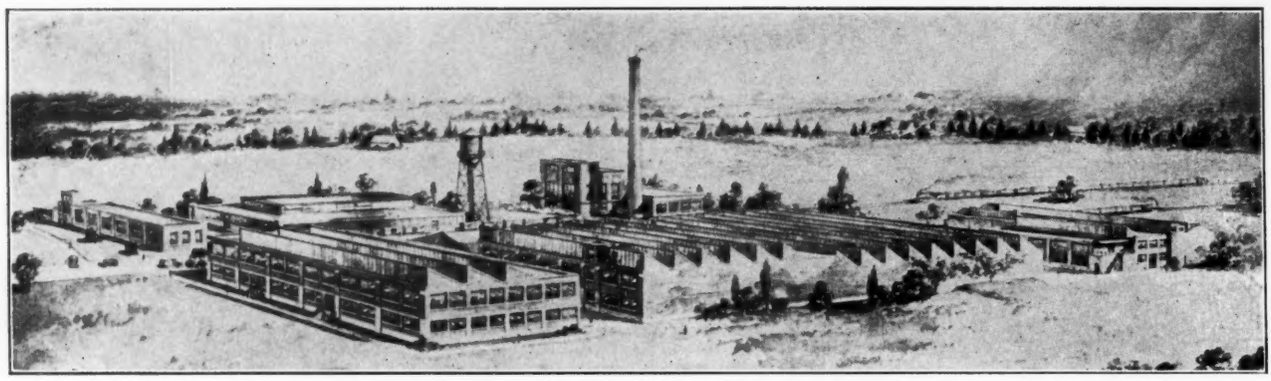
but detached industries located in single states for which additional lines are not provided. These comprise a $17,000,000 alcohol business and a $3,000,000 salt industry in Louisiana and a $2,000,000 baking powder business in Maryland. They have been included in calculating Table II, but their inclusion in Table I would not alter the qualitative relationships.

The degree of diversification varies between wide limits in the several southern states, as shown in Table II. There is, on the one hand, the wide distribution of chemical manufactures exhibited by Virginia, in which the first five ranking chemical industries total but 86.5 per cent of all her products. On the other hand the huge chemical development in Texas shows 98 per cent accounted for by the two major industries, petroleum refining and cottonseed products. The five ranking industries in each state have been expressed in this table as percentages of the state total, based on the data in Table I. Again qualitative in character, it serves to emphasize the important relationships, for while eight per cent of the total southern production is not included in Table II, each state is affected proportionately.

Louisiana, a conspicuous leader in southern chemical industry, with a total production of over $218,000,000 in 1927, is subject in less degree to the same comment as Texas and Oklahoma, respectively first and third on the list, namely, that petroleum refining overbalances all other chemical activity. With unquestionable diversification, her four leading chemical industries, petroleum, cottonseed, alcohol, and paper are mutually supplementary to a very limited extent.

Greater diversity exists in the chemicals and allied products of Virginia than appears from the thirteen products in Table I. This was brought closely to the writer's attention during a six-weeks' tour of Virginia chemical industries the past summer. While 86.5 per cent of her production is contributed by five industries, three of these are in fact as diversified themselves as separate activities. Thus rayon includes viscose, acetate, and nitrocellulose processes, each drawing not only on different sources of cellulose, but also on different lines of industrial chemicals. While all rayon plants bear a resemblance of a mechanical

North Carolina	*Oklahoma*	*South Carolina*	*Tennessee*	*Texas*	*Virginia*	*West Virginia*	*Other Southern States*(2)	*Total South*	*United States*	*No.*
.....	.....	.....	.....	$3,312,228	.....	$227,944	$760,000[1]	$11,463,140	$14,261,775	1
.....	.....	.....	$9,846,545	.....	$8,169,829	10,777,266	14,000,000[7]	54,862,708	548,535,935	2
.....	.....	.....	.....	.....	1,420,783	11,443,807	15,000,000[3]	54,846,427	382,012,617	3
$17,612,879	$20,295,804	$12,608,931	15,256,533	78,324,499	9,329,264	.....	5,900,000[8]	268,575,198	276,338,488	4
.....	313,013	.....	.....	.....	.....	437,750	6,900,000[4]	7,651,037	72,489,668	5
18,423,536	.....	11,739,872	4,923,651	811,408	15,272,776	.....	850,000[2]	133,432,777	190,384,890	6
.....	.....	.....	412,683	1,879,115	1,335,520	.....	2,350,000[6]	9,164,122	50,547,395	7
.....	.....	.....	.....	.....	.....	.....	2,889,439[4]	39,902,971	39,902,971	8
.....	*280,000	.....	.....	.....	.....	.....	3,700,000[6]	8,180,660	103,388,445	9
.....	.....	.....	2,065,376	2,301,613	681,526	3,592,264	2,680,000[3]	27,041,566	519,009,842	10
.....	.....	.....	2,265,719	.....	19,481,040	4,588,760	9,000,000[6]	62,179,585	919,891,465	11
2,002,161	.....	31,835	6,596,615	1,564,573	1,853,801	.....	2,600,000[4]	34,372,269	278,242,929	12
.....	.....	.....	5,215,852	284,236	289,164	.....	3,300,000[5]	10,608,408	161,245,659	13
.....	153,278,576	.....	.....	429,501,524	.....	14,827,454	55,000,000[5]	811,829,014	2,142,648,503	14
.....	.....	.....	3,047,402	.....	11,244,639	.....	12,600,000[6]	34,240,853	218,198,201	15
*1,000,000	.....	.....	*27,000,000	.....	*43,000,000	*21,000,000	.....	*102,500,000	*151,000,000	16
213,111	.....	529,307	2,088,178	1,879,723	805,810	.....	.....	10,131,717	42,885,573	17
403,760	.....	.....	464,749	.....	1,121,476	.....	880,000[4]	3,042,203	35,677,033	18
$39,655,447	$174,167,393	$24,909,945	$79,183,303	$519,858,919	$114,005,628	$66,895,245	$138,409,000	$1,684,024,655	$6,146,661,389	



Sylvania Industrial Corporation's Works at Fredericksburg, W. Va.

sort, chemically the processes have slight similarity among themselves. Pulp is represented by important capacities in soda, sulfite, and kraft form, as well as by the 30,000-ton cotton pulp plant operated by the Hercules Powder Co. Paper runs the gamut from super-calendered grades to spent chestnut-chip liner board and kraft paper "willow" furniture. The supplementary characteristics of Virginia's three leading chemical manufactures is exemplified in one community where all three products are well represented; four independent concerns manufacture respectively synthetic fertilizer and anhydrous ammonia, nitro rayon, purified cotton cellulose, and kraft paper. While all the inter-locking possible in this situation is not yet fully realized, at least the rayon and the cotton pulp is wrapped for shipment in the kraft paper and the synthetic fertilizer finds its way to the cotton fields and pulpwood preserves to hasten the supply of cellulose with which to manufacture more rayon and kraft paper. While a rather inadequate illustration, it is this sort of economy, effected by reduction in lost motion and duplication, the obvious result of a planned chemical development, which constitutes an important advantage of diversification.

Cellulose Industries

Cellulose in Virginia is like the magician's silk hat, from which a chemist in this case pulls 65 per cent of the chemical manufactures. Rayon yarns of all types are synthesized for ultimate use in clothes and fabrics; paper from brown box board to the finest book papers; paper products such as bags, boxes, and twine; and purified cotton is produced for use in the manufacture of lacquers, explosives, celluloid, and rayon. The 1930 production in this division it is estimated will represent a value in the vicinity of $100,000,000. Five Virginia rayon plants, will produce 45,000,000 pounds of yarn in 1930, according to the estimate of specialists in the field, which figure places the state definitely in the lead among American producers. Rumors that a sixth plant using the acetate process, is to be built at Hopewell, appear to be unfounded. The Tubize-Chatillon merger is not expected to entail new buildings in Virginia. The roster of Virginia rayon plants reads as follows:

Plant	*Est. 1930 Prod.*
1—Viscose Co., Roanoke	20,000,000 lbs.
2—Tubize Art. Silk Co. (nitro)	12,000,000
Du Pont Rayon Company	
3—Ampthill (viscose)	5,000,000
4—Waynesboro (acetate)	2,000,000
5—Industrial Rayon Corp. (viscose)	6,000,000
Total	45,000,000

Most of the impressive requirements of sulfuric acid, caustic soda, and acetic anhydride are purchased in the open market.

Geography has exerted an interesting influence on the development of the pulp and paper industry, for ten out of the fifteen plants of this group in Virginia are located along the James river, from the immense Covington mills of the West Virginia Pulp and Paper Co. to the 100-ton kraft mill of the Hummel-Ross Corp. at Hopewell. The largest in point of numbers of any one type of Virginia chemical industry, these plants are well distributed over the basin which extends inland to the Alleghanies roughly 50 miles wide and 200 miles in length. A profitable by-product development of the Hummel-Ross Corp. is the turpentine, rosin, and pine oil from the southern pine which supplies their pulp needs. One of the latest additions to the cellulose industry outside of the James basin is the Sylvania Industrial Corp., entering production of a cellophane-like paper at Fredericksburg on the Rappahannock. While the preparation of this product is understood to involve the manufacture of cellulose acetate, and thus resembles a rayon process, the product has the form and uses of transparent paper. Lime, salt cake, sulfur, soda ash, and

TABLE II (1)
Diversification of Southern Chemical Industries

No	*State*	*Total Chemical Mfrs.*	*Five ranking industries, % of Total* I.	II.	III.	IV.	V.	*total of 5 inds.*
1.	Texas	$519,858,919	*83	15	0.6	0.4	0.3	99.3
2.	Louisiana	198,046,236	*63.5	9.8	7.8	7.1	3.4	91.6
3.	Oklahoma	174,167,393	*88	11.6	0.2	0.1	...	99.9
4.	*Virginia*	*114,005,628*	*58*	*17*	*13.4*	*9.9*	*8.2*	*86.5*
5.	Maryland	82,630,433	33	15	14.6	13.7	10.3	86.6
6.	Tennessee	79,183,303	34	19	12.4	8.3	6.6	80.3
7.	Georgia	78,318,895	36	28	23	5.1	2.6	94.7
8.	West Virginia	66,895,245	31	22	17	16.	6.9	92.9
9.	Alabama	55,230,074	46	27	17	5.2	1.8	97.0
10.	N. Carolina	39,655,447	47	44	5	2.5	1.0	99.5
11.	Mississippi	33,646,891	83	8.3	7.6	0.5	0.4	99.8
12.	Arkansas	32,553,303	53	39	4.5	2.8	0.5	99.8
13.	Florida	29,732,705	50	45	3.8	0.6	0.4	99.8
14.	S. Carolina	24,909,945	50.7	47	2.1	0.1	...	99.9
15.	Kentucky	19,467,361	51	42	3.4	1.6	1.4	99.4

(1) calculated from Table I.
(*) Petroleum refining.

chlorine are all required for pulp and paper, for which the needs are met only partially with local resources.

The third ranking chemical industry is fertilizers, exceeded by Maryland, Georgia, and North Carolina. Water transportation facilities again accounts for the location of many of these plants in James river or coast sites. In the immediate vicinity of Hampton Roads with its converging world trade routes bringing potash, guano, lime, and phosphate rock, are found eight important producers. At Richmond 100 miles up the river is headquarters of the Virginia-Carolina Chemical Corp. operating 22 complete plants and 12 dry mix plants throughout the south. Virginia plants are located at Richmond, Lynchburg, Petersburg, and Pinner's Point.

Fixed Nitrogen

If the Atmospheric Nitrogen Corporation's new Hopewell development be included in the fertilizer capacity of Virginia, computing two-thirds of their present estimated nitrogen capacity as synthetic sodium nitrate at the current market, an annual gross of $17,000,000 is indicated on that item alone. The balance of the nitrogen leaving Hopewell in the form of anhydrous ammonia finds its way as well into the fertilizer industry to some extent, both as a source of ammonia nitrogen and through the chamber plant oxidation units as nitric acid. Situated on two railroads and an ocean waterway, this nitrogen fixation plant, the largest on the western hemisphere, is an important asset to fertilizer manufacturers in adjoining communities. It has a capacity greater than all other U. S. plants combined.

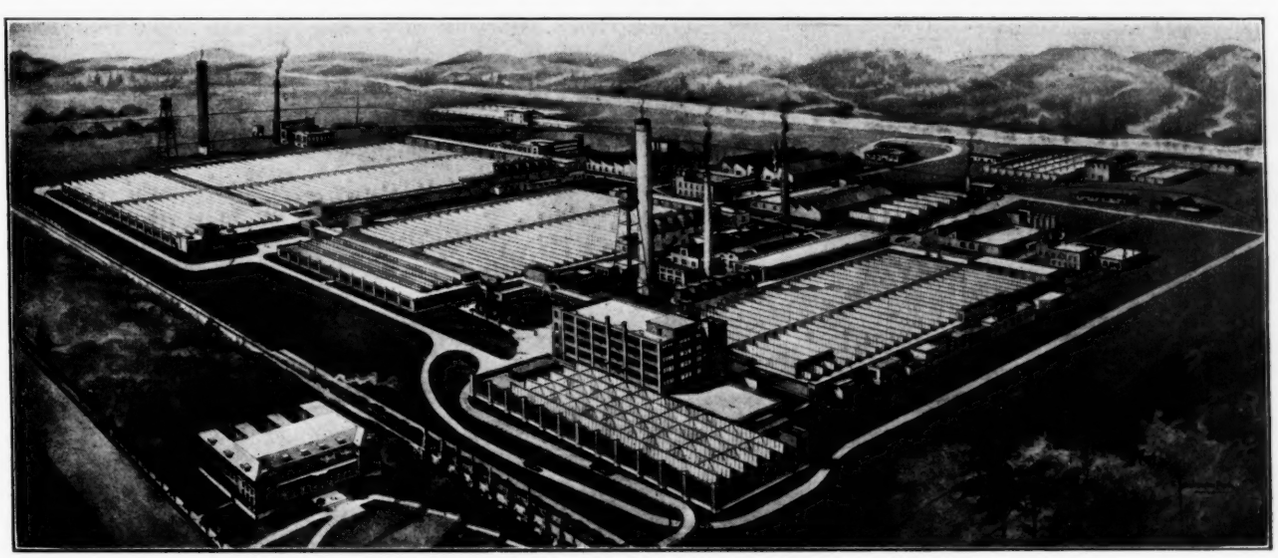
Cottonseed products and the tanning and tanning extract industries each contributed $9,000,000 in 1927 to chemical products. Of similar magnitude is an allied process industry not included in accompanying tables, the limestone and cement industry. Many lime kilns dot the state. One projected development is understood to involve the production of dry ice in connection with chemical lime. With the well-equipped and modern plants for the manufacture of these commodities existing in the state, regular growth may be anticipated. The Portsmouth Cotton Oil Refining Corp. operating in addition a subsidiary for electrolytic process hydrogen with an oxygen by-product, is typical of the first group; the John H. Heald Co., Lynchburg, making tannin extract and a 16-point liner from the spent chips, represents one of the second type; while the Lone Star Cement Co. at Norfolk is conspicuous among the third named.

Chemical Products

The Mathieson Alkali Works are at Saltville, an area noted for the largest salt and gypsum deposits south of the Ohio and east of the Mississippi. Caustic soda, soda ash, bicarbonate, and modified sodas are the staple products, to which additions may be made in the near future. The development of the gypsum industry in this area has been governed almost entirely by transportation facilities. South of Saltville at Plasterco the U. S. Gypsum Co. operates the deepest gypsum mine in the country and manufactures a wide range of decorative stuccos and finished wall board; north of Saltville at the Beaver Products Co. a Certainteed subsidiary, has extensive workings. A few miles east, at Ivanhoe, the National Carbide Corporation produces a high grade calcium carbide.

At Pulaski the General Chemical Co. operates the only sulfuric acid plant in the United States obtaining its sulphur from pyrrhotite, the ore having an empirical formula $Fe_{11}S_{12}$. It is understood that sixty-eight 16-foot Herreshoff burners roast this difficult ore for a contact process using a platinum asbestos catalyst, to yield an estimated 180 tons per day of 66 acid. A by-product of this ore is ferrous sulfide, obtained by a reducing and sintering process yielding about 800 tons per year.

The Phosphate Products Corp., subsidiary of Virginia-Carolina interests, is the second largest



The Viscose Co.'s Roanoke, Va. plant

manufacturer in the world of mono-calcium phosphate, marketed in the baking powder and three other grades. Among associated products are sodium fluosilicate for insecticides and proprietary fluo compounds for laundry preparations.

Tobacco By-Products and Chemical Corp., another subsidiary of the V-C, having works at Richmond, manufactures and markets plant insecticides of varying nicotine content. The spent tobacco waste contains not only useful nitrogen and potash, but also possesses properties which give good drilling qualities to fertilizers, and is therefore consumed in the neighboring works of the parent organization.

At West Norfolk is the Virginia Smelting Co., now engaged in the production of a liquid sulfur dioxide, with allied chemical products such as zinc hydrosulfite. Once a copper smelter turning out matte from Virginia ore, sulfur dioxide recovered from stack gases led to a unique process for absorbing, purifying and compressing this gas, which is now the principal product of the company, manufactured in excess of five million pounds a year with an average purity of 99.99. Wide application of this substance exists in textiles, refrigeration, and the new Edeleanu process for petroleum refining.

Organic Chemical Products

The American Cyanamid Co. recently acquired a unique Virginia chemical industry at Damascus in the Beaver Chemical Corp., manufacturers of sulfur colors and alizarines. It is the only manufacturer of alizarines in the country and believed to be the only dye plant now operating in the south. Close by is the Calcium Sulphide Corp. producing from gypsum rock a calcium monosulfide used as an orchard fungicide to replace lime-sulfur.

A production of 20 tons per day of cocoa butter at the Norfolk plant of the Prosco Oils Corp. is extracted with benzol; the solvent is recovered to be re-cycled, while the butter is refined to yield a very pure edible product, as well as by-product soap stock, cattle feed; the extracted waste material returns to the soil as fertilizer. Among other similar processes conducted by this recent organization is the extraction of rubber nuts with benzine to yield, after recovery of the volatile solvent, an oil used in both the paint and the soap trades.

The high grade coking properties and low sulfur content of typical southwestern Virginia coal lends its use to industries of which zinc and zinc oxide, steel, carbon dioxide, calcium carbide and phosphorus salts are typical products. Closely allied is the projected long-distance gas lines (for which franchises are now being secured) for the delivery of West Virginia gas through 200-mile mains to points in southwest Virginia. Lack of by-product ovens in Virginia and the opportunity offered by the piping plan for an economical gas supply indicate a successful outcome to the venture, an enterprise in harmony with the modern trends in fuel development.

TABLE III

Virginia Chemical Establishments (1)
(not elsewhere classified)

Group	*Product*	*No. of Establishments*
I.	Acids	8
	Carbonic (1)	
	Sulfuric (7)	
II.	Nitrogen and fixed nitrogen comps.	2
	Ammonia, anhydrous (1)	
	Ammonium sulfate (1)	
	*Sodium nitrate	
III.	Sodium compounds	2
	*Soda, modified	
	Soda ash (2)	
	*Sodium bicarb., refd.	
	*Sodium hydroxide	
VI.	Bleaching compounds (2)	
	*Calcium hypochlorite	
	*True calcium hypochlorite	
IX.	Chemicals, Miscellaneous	5
	Calcium carbide (1)	
	Ferro-alloys, electro (2)	
	Carbon bisulfide (1)	
	*Sulphur dichloride (2)	
	Sulphur dioxide, liq. (1)	
Total		17

(1) as grouped in Census of Mfrs., 1927, "Chemicals, n.e.c."
(2) projected.
* establishments counted under other products.

Future Developments

Large gaps exist in Virginia chemical industry to-day. The location of the "missing links" in the chain demands the immediate interest of chemical enterprisers seeking opportunity in less congested areas, more centrally located to both northern and southern markets. Seemingly conspicuous among the openings is that for by-product coke plants, especially in the vicinity of Norfolk, Richmond, and Roanoke. These in turn would be more readily undertaken if the metallurgical industry could be encouraged with a better rail schedule. Distribution of by-product gas, as highly desirable as it may be, cannot in itself justify the venture without adequate outlets for the coke which should exist in numerous potential metallurgical enterprises. Within a ten-mile radius of Richmond lie millions of tons of bituminous coal under a shallow overburden, of a grade probably best suited to mine mouth power and by-product plants. Ammonia oxidation in sulfuric acid plants awaits further development; such fertilizer chamber installations as have already been made are working successfully. The new, more rugged vanadium oxide catalyst may encourage more general use of contact plants in the agricultural south, using domestic pyrites deposits whose impurities would not now be fatal. In the fertilizer field, this would be an opposing factor to ammonia oxidation development. Increasing production of acetate products suggests the need for increased local capacities of acetic anhydride. At Kingsport the Tennessee Eastman Corp. is completing a plant which will probably supply a portion of the local requirements.

Chemical products, dormant for generations in Virginia, have revived to occupy an uncontested second place. Developments in the last two years indicate that the chemical industry will make a serious bid for first place with a $200,000,000 tobacco industry to supersede. New capacities, on a large scale, for rayon, fixed nitrogen, and certain heavy chemicals have entered into production so recently that industry in general has not yet had an opportunity fully to realize the position now occupied by this newest, and oldest, American chemical market.

Measure Your Market

How and Why?

Chemical sales are in most instances closely controlled by a form of marketing research carried on through constant correlation of salesmen's reports. The methods outlined here by Walter Emery, Director of Commercial Research, United States Rubber Co., and abstracted from a paper presented before the American Management Association, furnish an interesting basis of comparison for chemical sales executives.

INDUSTRIAL marketing research covers the calculation of the potential market for a material or commodity by territories, by industries, by customers, whether sold direct or through branches or jobbers. The purpose of such research is to furnish the sales or branch manager or the salesman with an estimate of the total available business in the territory and the names and locations of all prospects with an annual volume of purchases sufficiently large to be worth the salesman's time and effort. The sales manager is aided in fixing and in adjusting quotas, the salesman, in knowing which prospects are worth his greatest effort. The investigation should not be an entirely independent study. The research department not only must work closely with the sales organization but must rely in large part upon the information and experience acquired by the selling force.

Analyzing Actual Sales

The first step in a marketing research problem is the detailed analysis of the actual sales. This will indicate the trend of sales in the various branch or jobbing areas and in the various industries. A breakdown of sales by branches, by jobbers, by salesmen, by customers will often disclose a weakness in selling methods. As between two prospects of equal volume, the relative lack of success with one may be the fault of the salesman or the superior salesmanship of competitors. The setting down in a logical manner of the causes of success or failure will disclose the good and the bad factors in the present selling methods.

The next step is the analysis of salesmen's reports of calls. If properly prepared, such reports should include lost business and the reason, new accounts and how obtained, annual volume of total purchases and by whom sold, periods when orders are placed, who recommends the purchase and who places the order. If a report of this nature is prepared for every prospect known to the salesman, the branch manager can then check the list with a trade directory to see if the salesman knows his territory. Furthermore, in case of transfer of a salesman or a division of a sales territory, the sales manager has valuable written information for instructing a new salesman.

In case the salesman and the sales manager have no information as to the potential purchases of a prospect, it is frequently possible to make an estimate from published information. Trade directories usually give some measure of the relative size of the companies listed — capacity, output, number of machines, etc. Using known purchases of 100 per cent accounts as a basis, ratios are calculated which can be used to estimate the annual volume of non-customers.

Calculating Potential Sales Volume

The same method can be used for calculating the potential volume of a territory or of an industry. The census reports give labor force, horsepower, value of production, etc. which may be used in connection with similar data from 100 per cent accounts. A calculation of this kind will also serve to test the accuracy of the consolidated estimates of all salesmen in a particular area. When the industry being studied has a trade association or institute, the reports of production, shipments, stocks, unfilled orders, etc. will serve to measure the trend and perhaps fix the potential for certain industrial goods required by that industry. In the absence of any direct means of measuring the market in a trading area, it is sometimes possible to secure the informa-

tion from non-competing companies long active in the particular area. A similar method may be followed as to an industry. In addition, a study of the market for other commodities which are used by that industry will often develop a workable measure for the particular commodity or material which is the subject of the investigation.

Japanese Fertilizer Producers Ask Government Protection

World overproduction of ammonium sulfate has left the Japanese market for artificial fertilizers in the doldrums. During 1929 and the first two months of 1930, the price crumbled from 133 yen a ton to 98.50 yen, with British and German producers cutting quotations against each other and against the domestic makers. Prices now are profitless for the Japanese and the leading companies in the field are making urgent demands for protection, according to the "Wall St. Journal." The Germans, they say, are selling eight yen a ton below home prices and the British also are guilty of technical dumping.

Since the ammonium sulfate industry is of the keenest interest to the government, due to its military value, protection is not unlikely. The Showa Fertilizer Co. recently was granted a remission of taxes and the announcement which accompanied the grant indicated that other companies in the same line had only to ask to be given like favors.

Proponents of tariff protection of the Japanese industry present the argument that the Empire will be self-sufficient in three more years. Output in 1925 was but 160,000 tons. In 1928 it mounted to 222,584 tons and in 1929 it was 250,400 tons. With the huge Korean plant of the Chosen Artificial Fertilizer Co. soon to be completed, there are grounds for estimates that 1930 Empire production will come close to 400,000 tons.

Opposed to these facts is the fact that Japan, so far, cannot make ammonium sulfate so cheaply as Great Britain, Germany and the United States. Since the authorities are not anxious to give farmers further cause for complaint, this is apt to influence their decision on protection.

A tentative draft of a bill has been prepared by the Ministry of Agriculture and Forestry. It is designed to increase the consumption of fertilizer by the formation of a government distributing agency which will sell cheaply to farmers through the stores now operated by the various agricultural co-operative societies. There would be some kind of link between these stores and the government's scheme for making loans at low rates of interest, so that farmers might buy fertilizers on the instalment plan.

This plan is not wholly satisfactory to the ammonium sulfate trade. In the first place, it promises embarrassments to both makers and wholesalers. The latter, as a counter suggestion, are asking the government to give them the benefit of cheap loans and to remit taxes.

Japanese production and imports of ammonium sulfate have been as follows for the past three years (in tons):

	1929	*1928*	*1927*
Japan nitrogen	110,000	101,123	80,899
Electric-chemical	60,000	59,925	56,180
Japan artificial fertilizer	30,000	10	.....
Claude nitrogen	7,800	7,865	6,742
South Manchuria Ry	10,000	10,412	10,112
Daido fertilizer	4,000	4,045	4,112
Sub-total	221,800	183,381	158,045
By-product	28,600	39,204	29,127
Total domestic	250,400	222,585	187,172
From Great Britain	137,170	96,660	59,740
From Germany	179,990	147,060	134,620
From U. S. A.	52,960	28,020	40,180
Others	5,280	8,810	11,960
Total imports	375,400	280,550	246,500
Total supply	625,800	503,135	433,672

The Industry's Bookshelf

Merck's Index, published by Merck & Co., Inc., Rahway, N. J., 600 pages, $5.00. Discount of 50 per cent to members and those affiliated with the chemical, pharmaceutical, medical, and allied professions.

A new edition of this very useful compendium of information on chemicals and drugs of all kinds.

Materials Handling Equipment, by Edward J. Tournier, published by the McGraw-Hill Book Co., Inc., N. Y., 371 pages, $3.00

Descriptions of the varied types of equipment used in the handling of a great many different products.

The Public Control of Business, by Dexter Merriam Keezer and Stacy May, $3.00, 267 pages, published by Harper & Bros., N. Y.

A study of anti-trust law enforcement, public regulation, and government participation in business.

The New World of Physical Discovery, by Floyd Lavern Darrow, 371 pages, $3.50, published by Bobbs-Merrill Co., New York.

Monthly selection of the Scientific Book Club, being a popular treatment of present day conditions in the field of physics.

An Hour of Physics, by E. N. da C. Andrade, 160 pages, $1.00, published by J. B. Lippincott, Philadelphia.

A popular presentation of the properties of matter, of value even to the trained physicist because of its brief, accurate and pictorial presentation.

The Law of Chemical Patents, by Edward Thomas, 420 pages, $6.00, published by D. Van Nostrand Co., N. Y.

This book defines the law relating to chemical patents, shows what is and what is not patentable, and tells both chemist and attorney how to realize on chemical inventions.

Fundamentals in Physics and in Chemistry, by Lucien V. Alexis, $4.80, 336 pages, published by Author, New Orleans, Louisiana.

A high school principal seeks to establish scientifically the causes of all terrestrial phenomena in chemistry and physics.

Latex, by Ernst A. Hauser, 201 pages, $4.00, published by The Chemical Catalog Co., Inc., N. Y.

An authoritative description of the occurrence, collection, properties, and technical applications of latex.

Executives' Business Law, by Harry A. Toulmin, Jr., $6.00, 780 pages, published by D. Van Nostrand Co., Inc., N. Y.

This book affords a summarized legal knowledge that is essential to every one, in an easily assimilated form.

Foundations of The Universe, by M. Luckiesh, $3.00, 245 pages, published by D. Van Nostrand Co., Inc., N. Y.

An entirely popular treatment of physical science, the basis of all the sciences.

Romance of the Machine, by Michael Pupin, $1.00, 111 pages, published by Charles Scribner's Sons, New York.

Professor Pupin defending the spirit of technical science.

Packaged Chemicals

Pro and Con

Will the assembling and packing of many chemicals for sale to small consumers be taken over by the chemical producer to the elimination of the "package manufacturer"? Our editorial question struck some responsive notes of thought-provoking comment which we reprint in this article.

CHARLES C. BAIRD

For many years manufacturers, especially in our line, have been wholly dependent on jobbers or distributors for an outlet for their product, conscientiously turning down all opportunities to bid for business where it would at all be considered consumer business.

In a great many cases recently the jobber or distributor, due to competition, has been able to get the manufacturer to cut prices to where there is no profit in supplying them, and requiring that he be ready to ship material to them promptly upon receipt of their orders. Thus, it sometimes happens that a manufacturer has his goods made up and his money put into them months in advance of the time they are required; in other words, the manufacturer for years has been holding the bag for the jobber or distributor, and he in turn has very seldom made or had to make any concession in price to the consumer. I believe a great many people will bear me out in this contention.

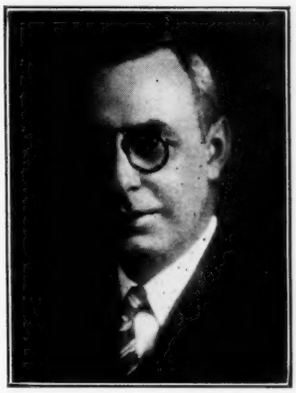
C. C. Baird,
President, Baird & McGuire, Inc.

If the jobber loses out, he has himself to blame. The manufacturer has his plant, a very large outlay sometimes, and he has to keep his corps of workers together, and it is a foregone conclusion that if conditions continue as they are, that it will be necessary for the manufacturer to go out and deal directly with the actual consumers of his goods, in any sized packages.

EDWARD J. BARBER

I carefully read the editorial on Packaged Chemicals in your February issue and my comment would be that the trend which you are predicting for the future is to no small extent an already accomplished fact.

It requires no special imagination on my part to picture John Boyer or Johnny Chew lending the weight of their salesmanship toward the securing of important contracts on packaged chemicals from Macy's or Woolworth's.



E. J. Barber,
Division Sales Manager, American Cyanamid Co.

As far back as five or six years ago, I was spending numerous hours in the buying office of those two companies, although I am frank to state that I did not find them manned by Vassar graduates nor furnished in plush and purple.

As one example of the trend toward manufacturer-to-consumer marketing of packaged chemicals, naphthalene which was formerly sold by the manufacturer to wholesale druggists in carload lots of barrels, is now put up in consumer size packages and is sold direct to the department and chain stores.

To me it seems not only possible but inevitable that the next few years will bring about an increasing shift to packaged chemicals, and with it, an increasing interest on the part of the chemical manufacturer in the problems of merchandising to the consumer.

EDMUND BILLINGS

The idea of direct sale of packaged chemicals from chemical manufacturer to general consumer seems fine to me. If there were such a market for carbon black I would be going after it. The only thing that has ever suggested itself is a possible face powder in Harlem and Africa, but the dignity of this company and the technical difficulties of the market have always held us back.

Speaking seriously, it seems to me that there is a really big market for chemical manufacturers in the sale of chemicals used steadily in every household, especially those items such as cleaning fluids, carbon tetrachloride for extinguishers, which are commonly bought from drug stores. The soap companies do a wonderful job at selling soap chips something like ten times the per pound cost of bar soap.

We have investigated the possible market for carbon black in one-pound packages for sale to the contracting and mortar color trade for manufacture of gray and black shades of mortar in concrete, but the demand available is so small that it wouldn't pay for the necessary investment in packaging machinery.

In general the industrial consumer is too keen a buyer to pay very much extra for a package. The success of package sales would seem to lie in the personal and household consumer; in other words, the great American public.

JOHN W. BOYER

For reasons which are not entirely clear to me, I know of no case where the retail packaging of chemicals has been vigorously and profitably directed by a corporation whose principle activity is the manufacture and distribution of larger quantities through the corresponding channels of trade.

John W. Boyer, Vice-president, Monsanto Chemical Co.

As far as analysis of these reasons has gone, I have been interested in the theory that no executives interested primarily in the latter field can persuade themselves that an investment in such intangibles as goodwill from advertising or from established retail brands or labels, is a solid capital structure. To them investment for profit means land, buildings, machinery, and processes — more goods at a lower cost or new products of greater competitive value. This natural specialization both makes them reluctant to initiate and continue the expensive program required for retail merchandising and also makes their management of such a plan, should they be persuaded to begin it, uncertain at critical points in its progress.

Many of us become interested from time to time in reviewing the price which we secure for tank cars or carloads of this or that chemical as compared with the price which the consumer pays for it in slightly different form or slightly different package, but it takes very little experimentation to see that wide margins disappear with the addition of the cost of advertising and distribution.

In other words I am, up to date, inclined to feel that this field of distribution, at least in chemicals, is another illustration that this is the day of the SPECIALIST.

HERMAN SEYDEL

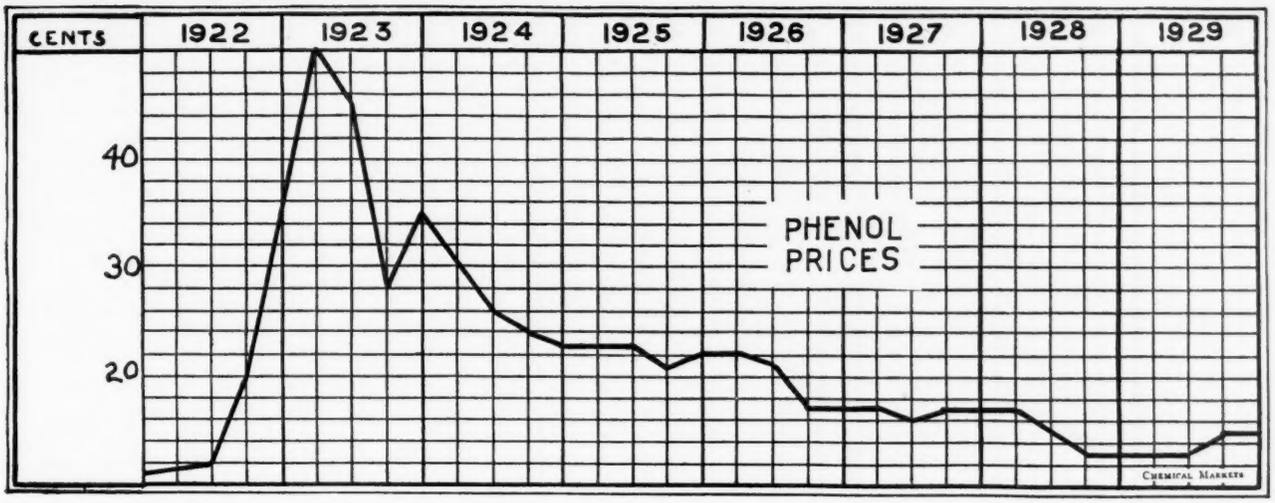
As far as I can see nothing but good can come of calling a spade by its real name. Years ago someone sought notoriety and self-aggrandisement by declaiming against benzoates. A great hullabaloo was produced and finally the Remsen Board put its most favorable O. K. on benzoate, not only as a preservative of foods, but also as a medicinal agent, and every household of intelligence now approves of the label "1/10 of 1% Benzoate of Soda."

Herman Seydel, President, Seydel Chemical Co.

I am indeed very much in favor of the chemical manufacturer doing his own selling, and this is as true of Standard's gasoline, as it is of Carbide and Carbon's "Prestone." I, of course, appreciate that a good many middle-men will suffer, but looking back over thirty years of sales effort as a manufacturer, I think it high time that the manufacturer began to take to himself the profits that rightfully belong to him. I do not have any fear of anything very serious happening to John Boyer or our own "Benzoate" Smith selling chemicals to a "young lady from Vassar" for who, better than they, can tell their public the advantages of their own production. That some of us will fail in retail marketing is undoubtedly true, but that will be due more to a lack of ability to carry on, than to any fundamental defect in this new method of marketing.

And after all, is it very new, or are we only applying new colors to a very old picture ?

Italian production and consumption of acetic acid during the first nine months of 1929, compares with that of the corresponding period of 1928, as follows: Production, 1928—13,441 quintals; 1929—15,827 quintals. Consumption, 1928—13,714 quintals; 1929—14,850 quintals. Consumption figures are those of the fiscal authorities and represent acetic acid withdrawn from warehouse during the period under consideration.



PHENOL PROGRESS

DOMESTIC phenol production set a new peacetime record during 1929 when it reached an estimated total of about 18,000,000 pounds, which compares with 9,607,000 pounds in 1928, 8,041,000 pounds in 1927, 8,691,000 pounds in 1926, and 14,734,000 pounds, the previous record, in 1925. Imports also largely increased in volume during the past year, totaling 433,000 pounds, as compared with 1,033 pounds in 1928, 62,255 pounds in 1927, and 297,632 pounds in 1926.

As the major outlet for phenol is in the manufacture of synthetic phenolic resins, the tremendously increasing output may be attributed directly to the growth of the plastics industry and those industries upon which the latter in turn depends.

Expanding Phenol Production

During the past year, and continuing into 1930, conditions in the plastic industry have been marked by ever increasing expansion of operating facilities. Production of phenolic resins during 1929 has been estimated at about 33,000,000 pounds, comparable with slightly more than 20,000,000 pounds in the previous year. On the other hand, although electrical insulation has been the major use, indications seem to point toward a future field in the development of resins for molded furniture, interior trim, building vehicle bodies, hardware, machinery, and similar products.

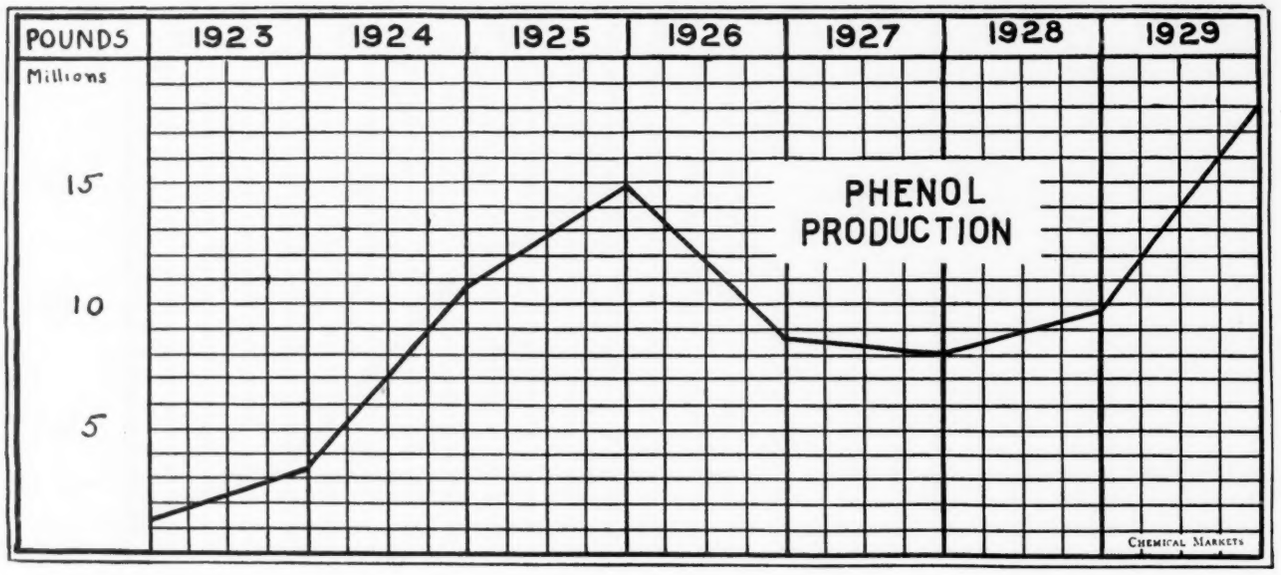
Phenol is now produced by two synthetic processes and from coal tar. The older synthetic method depends upon sulfonation of benzene with concentrated sulfuric acid to benzene sulfonic acid and subsequent fusion with caustic under carefully controlled conditions. A development of the past few years, however, has resulted in phenol manufacture from chlorobenzene and sodium hydroxide, in a process which has apparently greatly increased efficiency and reduced cost.

Before 1914, when the chief uses for phenol were as an antiseptic and disinfectant and as an intermediate for the production of dyes and pharmaceuticals, its yearly production was at the rate of about 1,000,000 pounds, obtained almost wholly from coal tar distillates. During the war, however, extreme demands for this product for picric acid production resulted in outputs of 64,000,000 pounds in 1917 and 107,000,000 pounds in 1918. The close of the war left producers with stocks on hand of about 35,000,000 to 40,000,000 pounds, estimated to be sufficient to satisfy normal demands for several years. Such was not the case however, as the growth of the infant radio industry, and the consequent call for large amounts of phenol plastics for use in electrical insulation, rapidly consumed existing stocks and resulted in a period of almost critical shortage.

Synthetic Production Resumed

In 1923, when natural phenol supplied all domestic demands, four new companies entered the field to resume production from benzene and sulfuric acid, and the increased output noted in 1924 and 1925 is due largely to the presence of the synthetic product. During the latter year about one-fourth of domestic consumption requirements were filled by the natural product.

Production of natural phenol is determined not only by the price and demand for phenol, but also by the cost of fuel, for when coal is scarce and its price is high, coal tar is burned. From 1920 to 1926



about 50 per cent of the crude tar produced in the United States was used for this purpose. Furthermore, natural phenol separation is limited by the consuming outlets for other coal tar substances. Extraction of phenol from the tar at coke oven plants, where the residual oils could be used for fuel, would be a profitable method of operation provided phenol prices warranted new plant investments.

Phenol Prices

Prices for phenol have varied considerably. Prewar prices from 6 to 15 cents a pound gave way to a price of $1.40 during 1916, but after the armistice there was a decline from 45 cents to 5 cents, with a later rise to 15 cents. When excess stocks had been absorbed, large demand coupled with shortage of supply boosted prices to 50 cents in 1923, but the entrance of new productive forces into the field caused a rather steady decline to 23 cents, which price was maintained fairly well for about a year and a half. The appearance of the new synthetic production from chlorobenzene during 1926 brought about price reductions to 17 cents and variations since have been within a four cent range.

Obviously the future for phenol is closely linked with plastics manufacture. This industry will undoubtedly increase, but not necessarily wholly within the phenolic resin group. The phenol-furfural type is enjoying an increased vogue, but so, if to a lesser extent, are the glycerine-phthalic plastics, and possibly the cresol-formaldehyde group. Vinyl, as well as glycerine-phthalic anhydride resins are looking toward greatly increased utilization as coating substances, a field in which phenolic resins have so far apparently been thought unsatisfactory. But these factors should not result in a very serious slowing of the steady forward movement for phenol in the synthetic materials field, where new applications come quite fast enough to absorb new, competitive plastics.

Fertilizer Imports Increase

Exports of fertilizer materials from the United States during 1929 amounting to 1,535,000 long tons ($20,444,000) were more than one-fourth greater than the 1928 tonnage and only 4,000 tons less than in 1913, the peak year for export tonnage.

The more outstanding features of the trade were the sharp advances noted in the sales of nitrogenous materials, land-pebble phosphate and prepared fertilizer mixtures and the marked falling off in shipments of high grade phosphate rock.

The following table shows the trend of export trade in fertilizer materials during the past three years:

	Long Tons		
Commodity	*1927*	*1928*	*1929*
Ammonium sulfate	138,692	93,015	145,189
Other nitrogenous materials	8,951	7,772	24,358
High grade phosphate rock	128,774	89,702	67,474
Land pebble and other phosph's rock	789,437	809,062	1,075,272
Superphosphates	107,507	88,613	85,118
Mixed and other fertilizers	97,682	130,674	137,211
Total	1,271,043	1,218,838	1,534,622

The United States is a net importer of nitrogen, the exports in the form of ammonium sulfate representing that portion of the by-product yield in excess of the estimated domestic requirements. Every effort is made to sell as much ammonium sulfate as possible in the domestic market before disposing of the surplus abroad. Exports, consequently, fluctuate considerably from year to year in accordance with the production of fertilizers for domestic consumption.

During 1929 shipments of ammonium sulfate from the United States amounted to 145,189 tons, as compared with 93,015 for the previous year—a gain of 56 per cent. This figure was only 36,000 tons, or 20 per cent, below that for 1926, the banner year for foreign sales of this product.

Over 95 per cent of the export of ammonium sulfate was destined for four countries. Japan was the principal buyer, taking 60,000 tons, or 41 per cent of the total The Netherlands, East Indies ranked second, taking 37,000 tons, while 30,000 tons were shipped to the Philippines. Exports to Cuba rose to 10,000 tons, more than twice the 1928 figure, but 50 per cent less than that for 1927.

Shipments of other nitrogenous materials reached 24,000 tons and were nearly twice the figure of any previous year. Exports to Canada, Germany, the Philippines and Japan doubled, the total sales to these four countries aggregating nearly four-fifths of the entire foreign sales. Purchases by Mexico, Cuba and the Netherlands, East Indies, which increased materially, also are worthy of mention.

The Increasing Production of High-Test Fertilizers Brings

Phosphoric Acid

A New Chemical Task as the Binder of Synthetic Ammonia

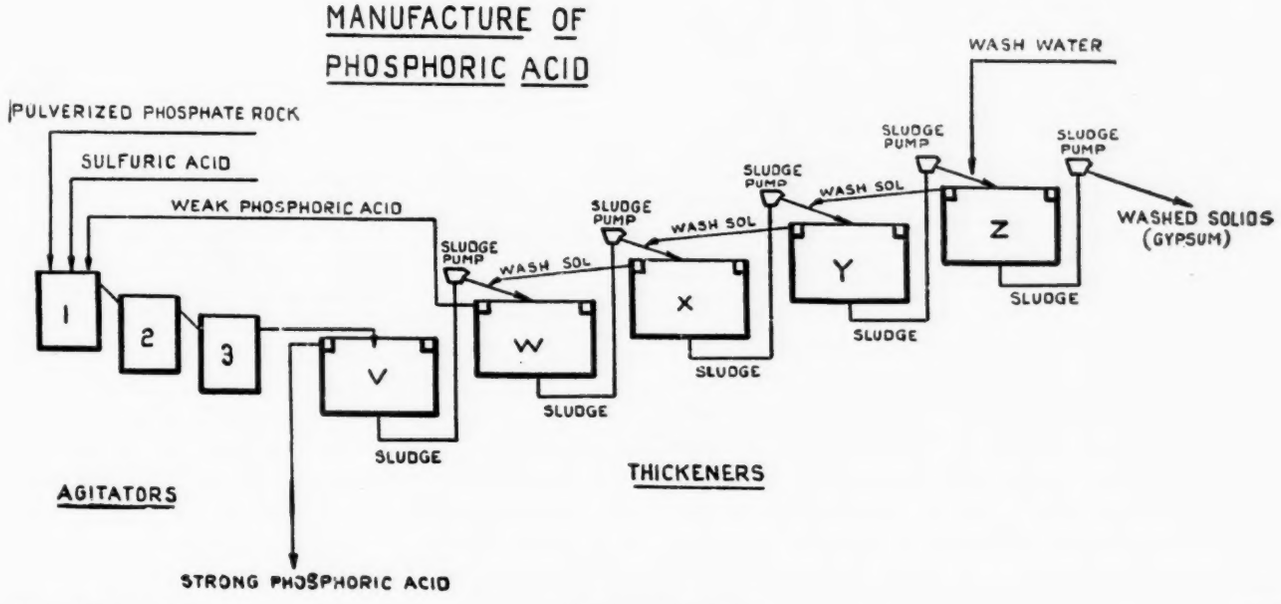
By W. C. Weber

Chemical Engineer, The Dorr Co.

In Europe a movement is afoot which bids fair to effect complete readjustment and reorganization of the manufacture of fertilizers.

While Germany has taken the lead and to-day undoubtedly occupies the foremost position, still this movement has spread rapidly across the entire industrial area of Europe and has resulted in marked advances in England, France, Belgium and Italy. The best minds in the chemical industries of these countries are concerned to-day with the manufacture of the so-called concentrated fertilizers, and enormous sums of money are being expended on research to the end that almost chemically pure plant foods may be prepared which can be blended in such proportions as are needed by the particular soil under cultivation.

The essential ingredients of these new fertilizers are nitrogen, phosphoric acid, and potash; the percentages of which can be adjusted at will to meet any conceivable number of variations in soil requirements. Advances in the technique of synthetic ammonia production have gone hand in hand with advances in the preparation of phosphoric acid, all of which has had the cumulative effect of placing in the hand of the chemical engineer the responsibility for supplying the fertilizer industry with the new materials which are so rapidly gaining favor.



The entrance of the European chemical organizations into the field of fertilizer manufacture on a gigantic scale is a logical development. The farmers of Europe have for generations been conversant with the best principles of soil fertilization and intensive cultivation of small areas. This has been the natural outcome of a situation in which virgin land is practically non-existent and the population per acre of cultivated soil is much greater than in the Western Hemisphere. The raw materials of fertilizer manufacture are at hand. While a good portion of the phosphate rock used comes from Florida, rock is available in Tunis, Algiers and Morocco, which is rich enough in P_2O_4 to be treated without concentration or washing. Potash in a very pure available form and in almost inexhaustible quantities is mined in Germany and France. The manufacture of synthetic ammonia has to a large extent relieved Europe of dependence on natural nitrates and made available large amounts at a reasonable price.

The United States is watching these European developments, and with the rapid developments in ammonia fixation that are taking place, it seems conceivable that the American chemical industry may exert a profound influence on the fertilizer situation here, an influence, perhaps, no less significant than in Germany, Great Britain, France, Belgium and Italy.

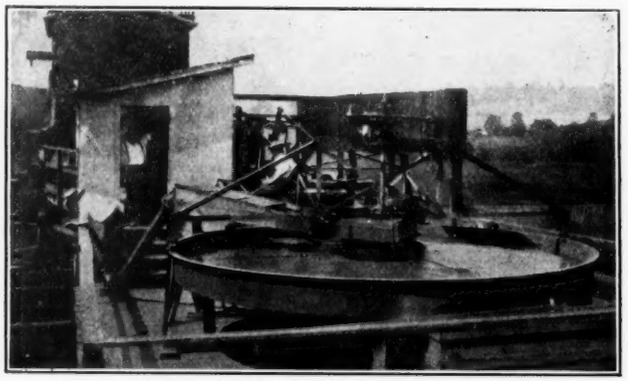
Phosphate Rock and the New Technique

Phosphate rock in powdered form is in itself a fertilizer of a certain degree of importance; treated with sulfuric acid in order to make more available the P_2O_5, it becomes the superphosphate of commerce (16–20% P_2O_5) the backbone of our fertilizer industry; treated with phosphoric acid it is double or triple superphosphate, a fertilizer containing 45% to 50% available P_2O_5. With the introduction of concentrated mixed fertilizers, phosphate rock has maintained its key position in the fertilizer industry because P_2O_5 is equally as important a constituent as nitrogen and potash in these blended plant foods and furthermore because when converted to phosphoric acid it is suited as an absorber of ammonia in gaseous form. Among the better known concentrated fertilizers of this latter type are mono-ammonium phosphate ($NH_4H_2PO_4$); di-ammonium phosphate ($(NH_4)_2HPO_4$); nitro-phos, a mixture of ammonium nitrate (NH_4NO_3) with either mono- or di-ammonium phosphate; nitrophoska, a mixture of either mono- or di-ammonium phosphate with ammonium nitrate and potassium chloride, and ammophos, a mixture of ammonium sulfate $(NH_4)_2SO_4$ with either mono- or di-ammonium phosphate. Calcium nitrate, urea, ammonium nitrate, synthetic sodium nitrate, potassium nitrate, potassium chloride, potassium sulfate and ammonium sulfate are concentrated fertilizers into the manufacture of which phosphoric acid does not enter, but in many cases their deficiency in the phosphate radical is made up later by their mixture with other fertilizers containing P_2O_5.

The United States is supplied with unlimited fields of phosphate rock and an ample production of sulfuric acid from virtually inexhaustible deposits of native sulfur. Although phosphate rock does not occur naturally as pure as some of the African products, nevertheless reasonably efficient and inexpensive methods have been developed for concentrating American phosphate rock to a commercial P_2O_5 content. Located in the southern states, the working of these deposits is a year round operation which can be entrusted to cheap, unskilled labor. With the availability of cheap sulfuric acid, the great majority of plants in the United States manufacture phosphoric acid by the digestion of washed phosphate rock with sulfuric acid, although a small quantity is made by the volatilization process by the direct treatment of the rock in an electric or blast funrace.

American Soil Under-fertilized

Impressive developments in our agricultural chemical industry are at hand in which many predict that mixed-concentrated fertilizers almost complete plant foods, may displace the older fertilizers which, except



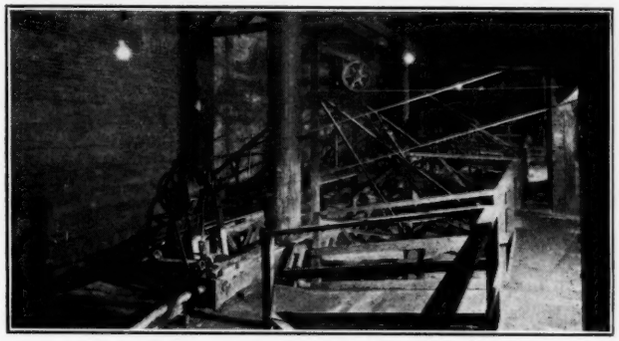
Washing phosphate rock at a plant in Tennessee

in zones close to point of manufacture, are too bulky to compete effectively with the compact synthesized materials. It is said that the nitrogen loss of the American soil is 3,000,000 tons per year and that to replace this loss the annual fertilizer application would have to be increased from its present value of 6,500,000 tons, 3% nitrogen content, to 100,000,000 or about 16 fold. The logic of this would appear to be borne out by data recently published by H. R. Bates of the International Agricultural Chemical Co. to the effect that Holland and Germany use on the average of 530 to 337 lbs of fertilizer per acre respectively, while the average American application is only 35 lbs. per acre. A review of German yields of rye, potatoes, oats, wheat, etc. shows that intensive fertilization of worn-out foreign soil is yielding from one and a half to twice the crop per acre as American soil, much of which may be classed as virgin soil by comparison. By-product sulfate of ammonia production has increased from about 200,000 tons in 1913 to more than

700,000 tons in 1927, due entirely to the rapidity with which by-product coke ovens have replaced bee-hive ovens, in which to-day not more than 10% of the coke tonnage is produced. Sulfate of ammonia production must therefore, follow the coke requirements of the iron and steel industry and is accordingly too inflexible for the increasing requirements of agriculture. Synthetic ammonia alone is capable of indefinite expansion and is the corner-stone of the new chemical fertilizer industry. From 1913 to 1927 the synthetic ammonia production of the world has increased ten fold, the greatest increase having taken place within the last two or three years.

Advances in Phosphoric Acid

Phosphate rock, which from the earliest days has born the same relationship to the fertilizer industry as sulfur to the chemical industry, promises, in modified form, to be the ideal carrier of our increased synthetic ammonia tonnage. The manufacture of phosphoric acid for the absorption of ammonia is therefore a very definite and important part of the new synthetic fertilizer industry. Fortunately improvements in the manufacture of phosphoric acid have kept pace with improvements in ammonia



Interior of a counter current decantation plant producing phosphoric acid

synthesis and modern phosphoric acid plants compare favorably with the best ammonia plants in point of continuity of operation, overall extraction and recovery, and conservation of labor and power. Furthermore, it produces as a by-product a finely divided precipitate of calcium sulfate which when processed with carbon dioxide and ammonia is probably the cheapest method of producing ammonium sulfate, thus using the sulfate radical twice, first for the decomposition of the phosphate rock and secondly for binding additional ammonia.

Of the phosphoric acid manufactured to-day in the United States by the acid digestion of phosphate rock, the great preponderance of plants employ a continuous process which is superior to the intermittent process of former years, to the extent of a very material reduction in the cost per unit P_2O_5. The principles of continuous digestion, decantation and counter current washing on which this process depends, are reliable ones adopted previously with success for the extraction of gold and silver by cyanidation, the manufacture of caustic soda, aluminum sulfate, barium chemicals, etc. to mention only a few of the better-known applications. A brief discussion of the modern phosphoric acid plant should accordingly be of interest in view of the important role which this material is bound to play in our growing chemical fertilizer industry.

A diagrammatic representation of the flow-sheet of a modern phosphoric acid plant is presented herewith. The reaction involved is well known and represented by the simple formula

$Ca_3(PO_4)_2 + 3H_2SO_4 + 2H_2O = 2H_3PO_4 + 3CaSO_4.2H_2O$.

The preparation of the acid may be subdivided into the following unit operations: 1. Grinding of phosphate rock; 2. Digestion of rock with sulfuric acid; 3. Decantation of phosphoric acid; 4. Washing precipitate free from acid.

If the washed gypsum precipitate is to be utilized subsequently for the production of ammonium sulfate or for the manufacture of plaster or building blocks a fifth unit operation, vacuum filtration, may be added.

Grinding Phosphate Rock

Domestic phosphate rock is chiefly mined and concentrated in Florida and Tennessee and the grades usually employed for phosphoric acid manufacture range from 68 per cent to 70 per cent B. P. L. (bone phosphate of lime) equivalent to a P_2O_5 content of 32 per cent. With Florida pebble rock, no particle is coarser than 5/8" and no preliminary crushing is required, while with lump rock it is desirable to crush to 1/4" to 1/2" before final reduction to 80-90 mesh.

Wet grinding in acid resisting tube mills in open or closed circuit with acid resisting classifiers is a recent development that has proved most successful at several large plants constructed recently. Wet grinding in phosphoric acid solution is practically always more economical than dry grinding and coincides closely with grinding methods in metallurgy where wet grinding has reached its highest development and has largely displaced dry grinding. In addition to the direct operating savings mentioned above in grinding phosphate rock, wet grinding eliminates the dust loss which in some plants amounts to 3 per cent and mixes the rock, weak solution and acid in a manner which is conducive to the formation of calcium sulfate crystals which settle rapidly and may readily be washed free from entrained solution.

The pebble rock or crushed lump rock and phosphoric acid are fed continuously into the feed scoop of the mill by an accurate mechanical feeder. The tube mill shell is lined with rubber to protect it from acid. Over the rubber lining there is laid first a layer of wood strips and second a lining of silex blocks, keyed in place and set in an acid resisting cement. The silex lining resists the abrasion of the rock and flint grinding media while the intermediate wood strips protect the rubber lining from irregularities in the silex.

The rock slurry issuing from the discharge bell flows into a classifier where, with the assistance of weak phosphoric acid wash solution, a separation at about 80 mesh is made. The minus 80 mesh rock overflows with the bulk of the solution into the first of several digestion agitators while the oversize is discharged by the reciprocating rakes and recharged into the feed scoop of the mill for further grinding. The classifier is constructed throughout of materials resistant to phosphoric acid.

Digestion of Phosphate Rock

Digestion is carried out in a series of acid resisting agitators arranged on slightly different elevations to permit gravity flow of the slurry through them and continuous operation. The total effective volume of the tanks provides the required period of agitation while the use of three or more agitators minimizes short circuiting or the escape of any portion of the charge in less than the required period of treatment.

The feed to the first agitator consists of mono- and di-calcium phosphate, pulverized phosphate rock and weak phosphoric acid, the overflow from the classifier. Sulfuric acid, generally 53° or 60° Be is added to this slurry continuously by an accurate feeder, the amount added being that required to complete the reaction and extract the available P_2O_3. Proper conditions of temperature and concentration are maintained to facilitate digestion and the formation of calcium sulfate crystals of correct physical characteristics. Agitation is provided in the horizontal plane by revolving arms, close to the tank bottom, and provided with plow blades to sweep any segregating material to the center. The material is rapidly circulated in the vertical plane by a central air lift column which also functions as the agitator shaft. Segregating material is swept under the intake of this column by the plow blades, elevated to the surface by the air lift and returned to circulation until decomposed into phosphoric acid and finely divided gypsum powder.

Decantation of Phosphoric Acid

The slurry leaving the last agitator consists of crystals of calcium sulfate and the inert constituent of the original rock, suspended in a solution of phosphoric acid. The acid may be 30° Be if desired in which case the ratio of acid to suspended solids will be in the neighborhood of 1½-2 to 1. With the proper control of digestion, temperature and the manner of adding sulfuric acid and weak liquor, the crystals of calcium sulfate can be obtained of mono-clinic, diamond shaped structure, easily settled, pumped and washed. The importance of careful control of the digestion step cannot be stressed too greatly in view of its influence on the efficiency of the subsequent separation of acid and solids.

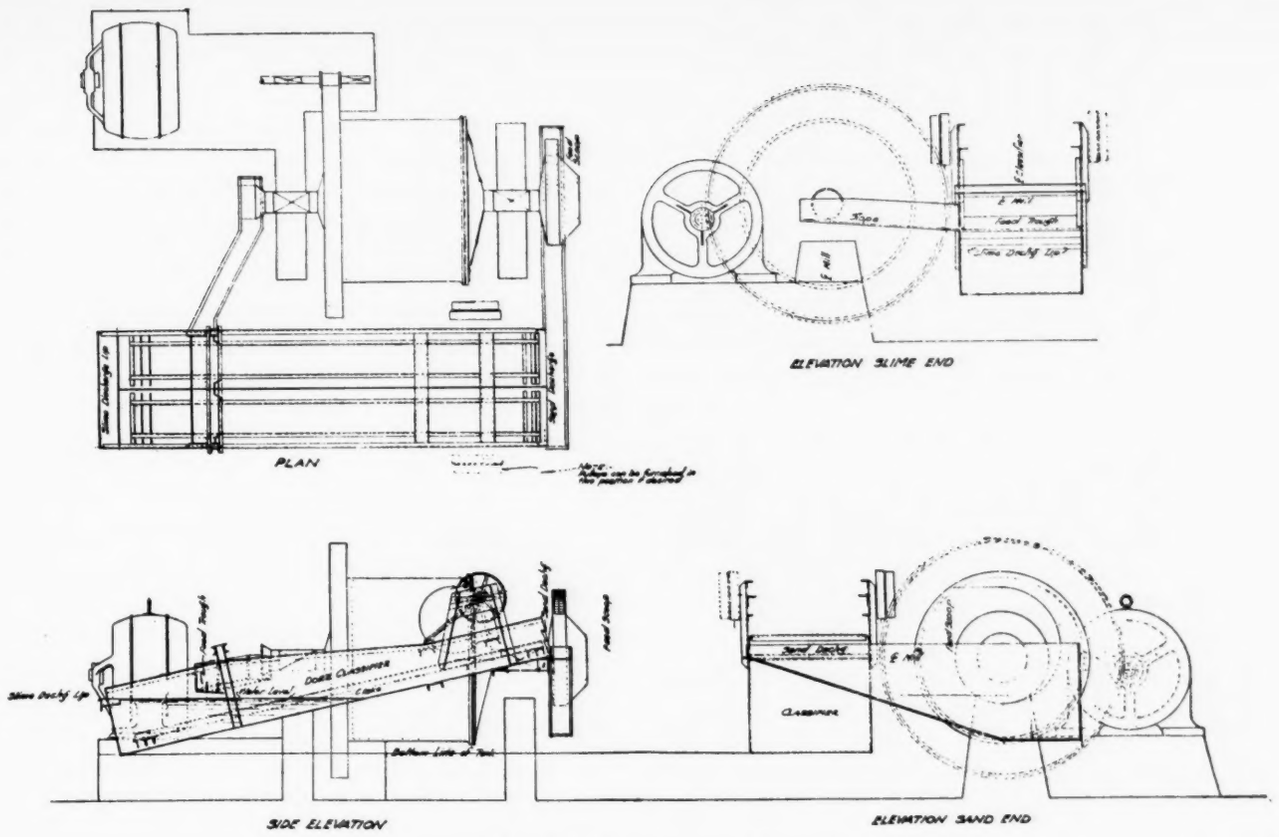
This separation takes place in the first of a series of several acid resisting thickeners arranged in series for counter current washing. The overflow from this first thickener is a clear and hot phosphoric acid, ready for treating phosphate rock for the production of double superphosphate, $CaH_4(PO_4)_2$—(50%P_2O_5), or as a carrier of synthetic ammonia to form mono-ammonium phosphate, $NH_4H_2PO_4$—(62% P_2O_5-12% N), di-ammonium phosphate $(NH_4)_2HPO_4$—(54% $P_2O_5$21%N) and the other mixed ammoniated fertilizers.

The calcium sulfate settled in the primary thickener is washed in the remaining thickeners to free it from entrained acid. The treatment is a counter current one in which the precipitate is pumped successively from one thickener to another toward the discharge end of the plant, being repulped between thickeners with weak solution cascading from one thickener to another in the opposite direction. The thickening operation following each repulping yields a clear solution for washing purposes in a preceding stage of the treatment and a dense sludge which is washed further with a weaker wash solution in a succeeding treatment stage.

The continuous counter current flow of solution and solids results in a most efficient displacement and recovery of acid. The solids, while being pumped toward the discharge end of the plant, are successively repulped with and settled from weaker and weaker wash solutions and finally water, being in this manner progressively impoverished in dissolved values. In a similar manner the wash water, added in a continuous stream of regulated volume, overflows from one thickener to another and comes in contact with sludges containing progressively greater amounts of dissolved values. The wash water enriched thus in phosphoric acid, finally overflows from thickener number two at a strength corresponding to 17-18° Be and enters the digestion stage as weak diluting liquor. Obviously the desired strength of the finished phosphoric acid determines the amount of weak liquor which may be returned to the digestion step, which in turn determines the volume of wash water which may be used in the last thickener.

Operating and Cost Data

Phosphoric acid plants of the continuous type herein described require not more than two men per shift, one in charge of the grinding and digestion and routine chemical control, while the other looks after operations. Extractions of P_2O_5 in the digestion step, amounting to about 96-97% combined with a washing efficiency in the counter current decantation step, amounting to 99%, give overall recoveries of P_2O_5 of about 95-96% in the form of a clear 30° Be phosphoric acid containing 22% P_2O_5. Unit production costs (including interest and amortization of equipment and buildings, rock delivered at $5.50 per long ton, 60° Be sulfuric acid at $8 per ton delivered, steam at 40c per 1,000 lbs., power at $1.05 per KW hr. and labor at $0.45 per hour) are from $0.47 to



Diagrammatic flow sheet of counter current decantation plant

$0.55 per unit P_2O_5 as 22 per cent P_2O_5 solution, the higher unit cost for the smaller plants and vice versa.

Quite recently, Frans G. Liljenroth, a prominent Swedish engineer, recognizing the dominant place that phosphoric acid is now assuming in the fertilizer and fixed nitrogen fields, developed an interesting series of processes for utilizing phosphoric acid to bind fixed nitrogen. Kunstdunger Patent Ververtungs A. G. of Switzerland, was formed in 1928 as a patent holding corporation and will continue research work in connection with nitrogen binding and the production of concentrated synthetic fertilizers. The processes controlled by these patents are known as the Dorr-Liljenroth processes since they work in conjunction with the Dorr type of continuous phosphoric acid plant.

Advantages of Process

These processes effectively tie together advanced methods of phosphoric acid production and ammonia synthesis, producing therefrom concentrated mixed fertilizers containing from 40% to 70% total plant food. From 20% to 70% of the nitrogen bound by these processes is in the form of the concentrated mixed fertilizers, while the remainder is bound in the form of ammonium sulfate, potassium nitrate and calcium nitrate, containing 14% to 21% nitrogen. These innovations obviate entirely or greatly reduce the quantity of sulfuric acid required, reduce the amount of water which has to be evaporated, permit the operating economies which follow the use of multiple effect evaporators, and eliminate all waste materials from the cycle of operations, thereby assuring complete conversion of all raw materials into products of value.

Agronomy and Chemistry

The Economic Symposium on Nitrogen presided over by Williams Haynes in the late summer of 1928, forecast the unlikelihood of by-product ammonia increasing materially in the future, and the surety that synthetic ammonia was cast for the chief role in the world fertilizer situation.

Phosphoric acid is one of the logical binders for the synthetic ammonia which is being produced on an ever mounting scale today. Plants for the manufacture of ammonium phosphate and ammonium sulfate appear to be logical additions to the plants producing older types of fertilizers, such as superphosphate.

Aniline dyes exports from Basel, Switzerland to the United States showed a 48 per cent increase in 1929 over the preceding year, according to a report from Consul Calvin M. Hitch, Basel, $2,034,010 worth being shipped to the United States in 1929 compared with $1,367,630 in 1928. This increase is attributed by Basel exporters to the demand of the silk trade and the exports during the past year are said to have been confined almost exclusively to this trade.

Italian exports of crude tartar from Messina to the United States showed a large increase both in volume and value, rising from a total of 456,858 pounds, valued at $39,142 in 1928 to 1,763,680 pounds of a value of $162,131 in 1929.

Shifting Chemical Demands

H. O. Moraw of the Department of Commerce checks up some recent effects of technology upon sales.

RECOGNITION of economic changes affecting the demand for a given product may logically be followed by the recognition of a sales opportunity for another product. Since the recent extraordinary advances in chemical research have provided so many new processes, new products, and new tools, it is but logical that the struggle to adapt the new properties of the new products to utilitarian purposes of the human race will be on a grander scale than ever before.

In this struggle, the economic and technological inter-relation of different raw materials and their various derivatives should receive more intensive study.

Technico-Economic Changes

For example, consider such raw materials as corn sugar and hydrocarbons. By selecting suitable ferments, corn sugar may be made to yield different alcohols, or ketones, or lactic acid, or vinegars. These may be used as such or converted to other derivatives. On the other hand, a given hydrocarbon raw material such as ethylene may by one process be converted to acetic acid to-day, but with a change in the market conditions the same raw material may by another process yield another hydrocarbon or derivative for which there is a better demand.

This ability of chemical science to change many of our important raw materials or end-products in accordance with the market demands may be called production flexibility or product flexibility. Whatever it may be called, it must be considered as a stabilizing factor for the chemical and related industries.

Apropos of this, among the observations made in the Chemical Division recently is an interesting economic change which is taking place in our domestic market involving diminished supplies of niter cake and salt cake. The chemical developments affecting the change in supplies of these materials are the adoption of ammonia oxidation units in sulfuric and nitric acid plants and increased production of synthetic hydrochloric acid, respectively. The principal cause of this situation is attributed to increased use by the pulp industry, sulfate pulp production being approximately 725,000 tons in 1928 and 1,000,000 tons in 1929.

Inquiries were recently received in the cottonseed pressing district of the south from foreign sources for supplies of cottonseed hull bran at $15 per ton delivered in Europe. This material has until recently been one of our many agricultural waste materials. But investigation by the Bureau of Standards and other agencies showed it to be one of the best sources of xylose as well as furfural. Adequate supplies of the latter are available from other sources, but xylose has heretofore been more or less of a laboratory curiosity. Biological laboratories have been accustomed to paying at the rate of $100 per pound for their requirements. Now it is expected to be available for less than one dollar per pound.

New Uses for Old Chemicals

One of the interesting inquiries which recently came to the Chemical Division was for information about the prevention of corrosion of coal cars by the calcium chloride now used widely for preventing coal dust annoyance. This is an illustration of a new problem arising as a result of adopting a well-known chemical to a new, very logical and practical use, The corrosion problem in this instance may require a new investigation for its solution, but it is recognized as a serious economic problem about which the

Abstracted from paper presented before Rochester section, American Chemical Society.

railroads are vitally concerned because of the probability of diminishing the useful period of a coal car from about 10 years to a much shorter period.

Coal in one form or another is one of the most important items in the economic picture of the world. Intimately associated with it are international relationships and sociological problems of vast significance. It is as a raw material for chemicals. however, that coal is really of most interest. The distillation of coal and the utilization of coal tar products is a pre-eminently important and even a romantic chapter in the present age of chemistry, but it is quite likely that the hydrogenation of coal may prove in years to come of even greater interest.

Effects of Oil Hydrogenation

In the United States we are interested in the hydrogenation of coal only in an academic way. The hydrogenation of petroleum is of immediate and deep interest to us and though undertakings in this field are but in their infancy, economic results of magnitude may be expected to develop. It is the opinion in some quarters that the oil industry is hampered by irrational production and distribution, and the application of the principles of hydrogenation to the production of oil will result in more orderly marketing of petroleum products. The application of science to industry as an aid to marketing is very apparent in this case.

The change in the economic position of the wood distillation industry, which was threatened by synthetic acetic acid and methanol, has been deferred as a result of the tremendous growth of the rayon, lacquer, cellulose acetate, plastics, and related industries, with their requirements for these chemicals. These new domestic consuming outlets have moreover, reached such magnitudes as to use not only the acid equivalent to the acetate of lime formerly exported but require imports of acetic acid. For example, in 1928 exports of acetate of lime were 5,000, 600 tons, compared to 50 tons in 1929. In the latter year, nearly 15,000 tons of acetic acid were imported or an increase of 6,000 tons in a single year.

The past, present and future of phenol constitutes a shining example in any thesis in the field of chemical economics. Increased demand in the United States for phenol was such that manufacturers were compelled to obtain supplies from sources not previously utilized. A large part of this demand is due to growth in the synthetic resins industry. The estimates for 1930 output of phenol of 50,000,000 pounds is apparently based upon rate of growth of the synthetic resin reproduction in the recent past. The rise of this industry is indicated by the growth in output from slightly under 13,500,000 pounds in 1927 to nearly 20,500,000 pounds in 1928, and somewhere between 33 and 40 million in 1929. For 1930 it has been estimated that 80 to 90 million pounds of synthetic resins will be produced in the United States. Some observers consider that demand for phenol a few years hence will greatly exceed these estimates.

It is possible to cite almost without end examples pertinent to the subject of chemical economics which show in one way or another the application of science to industry as an aid to marketing. The synthetic organic chemical industry is particularly rich in such references. The same is true in the fertilizer industry, an industry which, by the way, is destined to play a much more significant and important role as time goes on.

The value of the United States annual production of the groups classed as chemical commodities is approximately $2,750,000,000, which is practically as great as all other world producers combined. By deduction, it is likewise obvious that American chemical consumption is also practically equal to that of the rest of the world combined, though we represent but 1/15 of the world's population. Perhaps the magnitude of United States chemical production can be better appreciated by comparison with the estimated total world production, which was placed at $4,154,000,000 for 1924, as reported at the Geneva Conference. At that time our chemical production was over 47 per cent of the world total.

While the United States, Germany, France, and the United Kingdom represent over 80 per cent of the world's chemical production and consumption, American chemical consumption is relatively twice as great per capita. Aside from catering to their own consuming demand, these four countries likewise supply four-fifths of the world trade demand. The United States, however, accounts for but one-fifth of this demand. We are, nevertheless, not neophytes in world trade for as far back as 1806 we recorded exports of $953,000 worth of medicinals. About 1830 production increased faster and greater efforts were spent in finding export markets.

Increasing Chemical Exports

Total exports of chemicals from the United States are now over $200,000,000 annually, or about 8 per cent of our production. The principal foreign producers, however, export from 15 to 35 per cent of their production. Estimates place world exports of chemicals and allied products in 1913 at $762,000,000 and in 1927 at $1,072,000,000, or an increase of over $300,000,000.

Viewing the world chemical trade as a whole, the American chemical industry is not so much concerned with the so-called danger of over production, which is apparently the main factor leading to the European cartels. On the contrary, the viewpoint which seems to fit in with American aspects is that consumption can continuously be expanded by maintaining high purchasing power and intensive cultivation of new wants, and stimulation of trade in the usual channels.

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Cost Accounting

in its modern relation to the

Chemical Executive

By D. A. Wilcox, Chem. Eng.

COMPETITION in this country has been coupled with progressively-minded management. The result is a constant state of flux in all manufacturing operations, with all efforts directed towards greater efficiency and lower costs. The result is that costs have so decreased during the last few decades in this country that the average scale of living has been lifted to a plane beyond all comparison with any other country or any other time. Competition has forced management to lower costs or get out.

Modern cost accounting is a tool of modern business whose importance is constantly increasing. Its aim is to throw a searchlight into every nook and cranny of the business and to seek out for the management facts—facts—facts. Far from confining itself to a mere determination of cost, it now covers the entire field of business, from the purchase of the raw materials to the final disposal of the product to the ultimate consumer. And at every point along the way it measures results and searches out information which the management needs to guide its operations.

Scope of Modern Cost Accounting

Modern cost accounting not only follows operations, but it aids in planning and directing them. Through the medium of the budget and the foundation laid for it in the cost system, the management is forewarned as to what to expect and may lay plans accordingly.

Let us see for a moment some of the things which come within the field of the cost accountant. Materials are purchased—he notes whether or not prices were in accordance with standards, and shows the effect on profits of any deviations. Are the articles of the correct size, type, quality and so forth? He measures these factors and the effects of any variances from the specifications, and, with the aid of the operating departments, he shows what would be the effect of changes. How about quantities? Through a study of past records he sets up limitations for the inventories so that the purchasing department may know the safe limits. This enables the management to keep the inventories from becoming top-heavy. Excessive inventories and stocks on hand invite carelessness in stock handling and inevitably increases the probability of breakage or damaging. These and many other facts concerning the question of purchasing are needed by the management, and the cost accountant must be prepared to furnish them.

Suppose now that our raw materials are in the bins and are being converted. Each step in the process must be watched most carefully to develop the utmost efficiency. Are correct quantities being used? Are materials routed properly through the plant?

What are allowable shrinkages and what constitutes waste? Is the present method of conversion the most economical or would some other method be cheaper? In the case of new equipment, how well are the estimates of savings being fulfilled? Can some system be devised to increase man-hour productiveness either by incentives or otherwise? Is the equipment being efficiently utilized, and are supplies and repairs within season? These and many more problems are constantly being answered by cost accountants so that the management may have full information at all times.

Sales Efforts and Costs

But the duties of the cost accountant do not end with the factory and the determination of mill costs. It is well known that all steps of factory operations have been the subject of intensive study for many years past, but thus far we have hardly scratched the surface. What about the costs of distribution? Are we spending more to gain volume than we can effect in savings if we should get it? Is the sales department spending hundreds of dollars to develope a territory which could not possibly show a commensurate return? This is far from being a fantastic idea—it happens every day. A study of the costs will disclose the most economical volume considering the effect on manufacturing costs and the expense entailed by increasing sales resistance as the effort for further volume is pushed. What is the most efficient way to secure distribution—through agents—through jobbers—direct to the consumers? What is the effect of advertising? Are we losing money on a volume of small sales? These and many more problems, together with such matters as the proper allocation of selling and administrative expense to particular products and lines are further facts which the management needs to have at its command in order intelligently to direct the selling policies of the company.

Finally another phase enters. Not only must a careful check be kept on all steps of the operations but also the costs must be rearranged and compiled so that the management may know what is a fair cost for each product to guide it in the determination of selling policies.

Varied Nature of Modern Accounting

Modern cost accounting does not confine itself to the limitations of its title but has far outgrown its original sphere. To-day it concerns itself with every means of securing information that can aid the management be it in dollars and cents, B. T. Us. or any other form. Thus it must consider physical statistics; it must consider engineering and chemical matters; it treats of heat units and atomic weights, of yields, shrinkages and waste and it considers markets, sales expense and elements of distribution. Of necessity it goes beyond tangible factors and concerns itself with intangible matters such as organization; it deals with practical psychology as in its investigations of labor incentives, and it studies human nature to the end that it may sell its ideas and aid those whom it wishes to assist. It must frequently rout out pet ideas about costs and replace them by more accurate and useful methods and this is, more often than not, no mean job of salesmanship.

Cost accounting is not management nor can any automatic means of providing management through the mere compiling of figures be accomplished. The cost accountant should be the right hand man of the management and should supply him with any facts which he can use, but the executive, on the other hand, must weigh these facts and made his decisions accordingly.

The management must manage, but it must have facts—not fancies or hunches. There is no phase of the business in which the cost accountant (for want of a better title) cannot delve with profit to all. But to do it intelligently the cost accountant must have the management view-point at heart and should be first an engineer and incidently an accountant. This is particularly true in the chemical industries in which the technical end plays such a large part.

Costs Based on Judgment

What is the final cost of an article? So far from being determined with mathematical precision, there is involved a large degree of judgment and, to a great extent, it is purely a matter of opinion. Thus in any concern making any product two cost accountants of equal ability can, and very likely would, get two quite different costs and each would be equally defensible The opinions of each as to the allocation of overhead or as to the rates of depreciation to be used, or the handling of the matter of lost time would all affect the final results. The difficulties of securing an *actual* cost are great and in but few cases can it be more than approximated. The degree of accuracy depends upon the case taken in all details and the ability of the personnel of the cost department to devise the best system for the particular conditions. Cost accounting is not an exact science and costs are based largely on matters of judgment.

Two firms may be bidding for the same market and one get the order at what appears to the other to be a price below the cost, but which, to the first one is based on a cost which shows a fair margin of profit. Yet they may be identical in all respects except as to the opinions of their cost accountants as to the proper allocation of certain general expenses or some other factors. They cut each other's throats merely because their cost accountants do not agree as to procedure, whereas if they both followed the same methods they would have costs which would differ only for reason of their local conditions and competition between them would be on a much fairer basis.

How is it that such differences of opinions may come about? Suppose that our own plant makes only two articles, gaskets and gadgets and does it all in a single room. We can determine the cost of the direct

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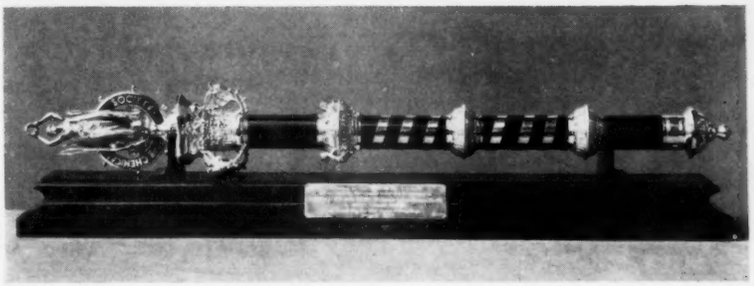
Photographic View

George Eastman (left), founder and chairman of the board, Eastman Kodak Co., who will receive this year's medal of the Institute of Chemists for distinguished services to chemistry, chatting in his famous rose garden, with his old friend Thomas A. Edison.

Cyanamid's far-flung interests move westward—a view of the plant of the Arizona Chemical Corp., recently acquired by the Kalbfleisch Corp. to take over natural salt cake deposits near Clarkdale, Ariz., which were formerly operated by Sodium Products Corp.

NEWS REEL

of Chemical Progress

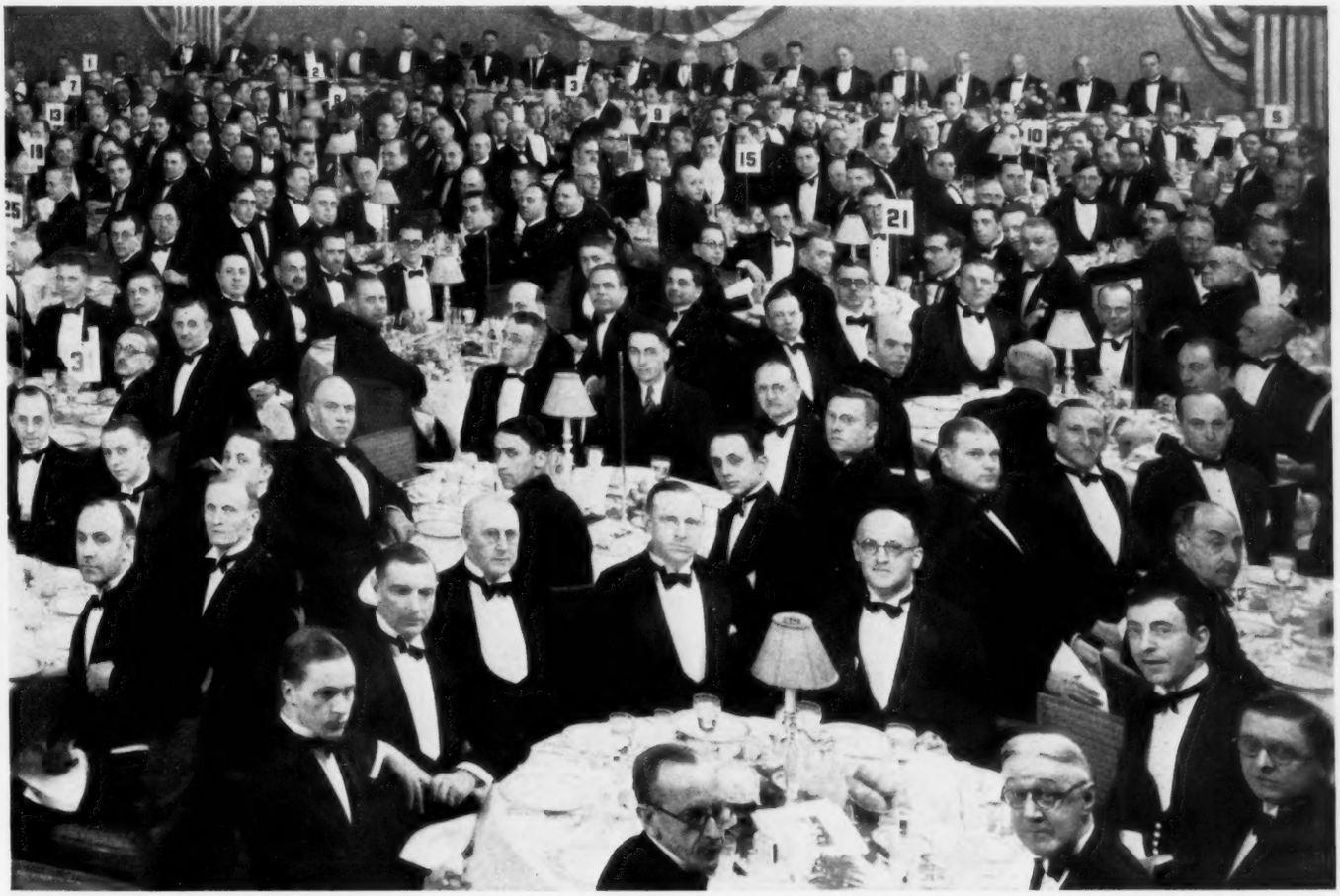


This silver mace was recently presented to the Chemical Society of England by Ayerst Henham Hooker. It is rumored that there is a movement under foot to present something of similar nature to the Secretary of the American Chemical Society

Dr. J. C. W. Frazer, Professor of Chemistry, Johns Hopkins University, in his Baltimore laboratory where he conducted the research that lead to the discovery of a catalyst which transforms carbon monoxide into carbon dioxide and which it is claimed will be eventually adapted to use on automobile exhaust fumes

Below—The Four Hundred (count them) among the leading chemical and drug executives gathered at the Hotel Roosevelt, in New York at the fifth annual drug, chemical and allied trades dinner held under the auspices of the Drug and Chemical Section, New York Board of Trade, on March 4

(*P. & A. Photos*)



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materials and labor with a fair degree of accuracy and arrive at the direct costs, but what about the rent of the factory, the superintendent's salary and the office expense and so forth ? One accountant says "Divide them among the gaskets and gadgets in proportion to the totals of their direct costs," but the other says, "No; rental should be divided on the basis of the floor space occupied, the superintendent's salary on the basis of the number of men employed for each product and the office expense on the basis of the number of orders." Each has his own opinion and each gets a different cost for the gaskets and the gadgets and who can say which is right ? Both may be right.

The Accountant's Technical Problems

As the number of products mount up and the number of departments increase these problems increase out of all proportion and the importance of well-founded opinions becomes more and more essential. In many cases the accountant has to rely on the help to be received from the operating departments, but in many cases, either for lack of time or the intricacy of the accounting problems involved, he has to depend upon his own resources to get the answer. Hence the cost accountant should be as fully conversant with the engineering and technical phases of the business as possible so that he can make these decisions with the greatest possible degree of accuracy and also understand the information obtained from the operating department.

If executives will appreciate right at the start that the complications in costs and cost systems are inherent in the nature of things, two important things may be brought about. One is a realization of the importance of establishing uniformity of procedure within an industry, and the other is the necessity of getting the best possible man for the job.

Functional and Unit Costs

There are two aspects to the problem of cost accounting, getting the functional costs and getting the unit costs of the various products. The first considers the costs of the various operations; of the costs of steam and its use; the cost of labor, of supplies, of maintenance and repairs, of materials and so forth. The unit costs of the products is essential for the general management and the sales executives and must be fully developed, but it is of little practical use to the operating men, who, for their purposes require the functional costs. After all, a final unit cost is the sum of the costs of many steps and if we operate at maximum efficiency all along the line and keep losses to a minimum the resulting costs will be as low as possible. Thus in order to reduce costs we must consider the control of the various functions and it is the responsibility of the operating force to do this. That is their job and having done it they have fulfilled their responsibilities, be the resulting unit costs what they may.

One of the important duties of the cost department is to do its share in controlling costs. This is a term used very much in the manner its title implies, but its technical meaning in cost accounting is to provide means of showing at all times the relation between the actual costs prevailing at the time and what might be considered as reasonable costs. The accountant's function is to collect the facts and to present them to the proper executive and it is the executive's function to act on the facts so presented so as to keep costs within line. In order to accomplish these ends the following fundamental principles must be met.

Principles of Cost Control

Organization: Control is achieved by having the company so organized that each person has definite responsibilities and then holding him to the performance of his duties.

Relativity: Appreciation of the true significance of costs or other controllable data can be secured only through their comparison with standards of measurement.

Reduction of Variables to a Minimum: In order to correct a fault it must be isolated. Each factor affecting the costs must be studied separately so far as possible in order to avoid confusion.

Simplicity: To be used intelligently a report must be understood, hence all cost figures must be presented in a simple manner and come within the scope of the recipient's ability to grasp them.

The matter of organization is of prime importance both from the standpoint of the management and of the cost accountant. In fairness to the men themselves each executive, from the straw bosses right on up to the top, should know definitely just what they are responsible for and to whom they are accountable. From the accounting standpoint the greatest value lies in reporting the extent to which each man in the company is fulfilling his responsibilities. With this information at hand the executives can put their fingers immediately on the sore spots and correct the faults.

Relativity in Accounting

Efficiency in operations is achieved through the use of measuring sticks for the operations—measuring the results against definite standards. Thus the simple statement that a cost is $50.00 per ton is, in itself, meaningless until it be known that it should have been, i. e. the standard for it was, $45.00 whereupon it immediately takes on significance. The basis of modern cost accounting lies in this matter of relativity—stating the relation between actual conditions and standards of performance. It endeavors to search out all points where facts should be measured; to provide the necessary standards and the means of comparing the actual results with them, and finally reporting on the results.

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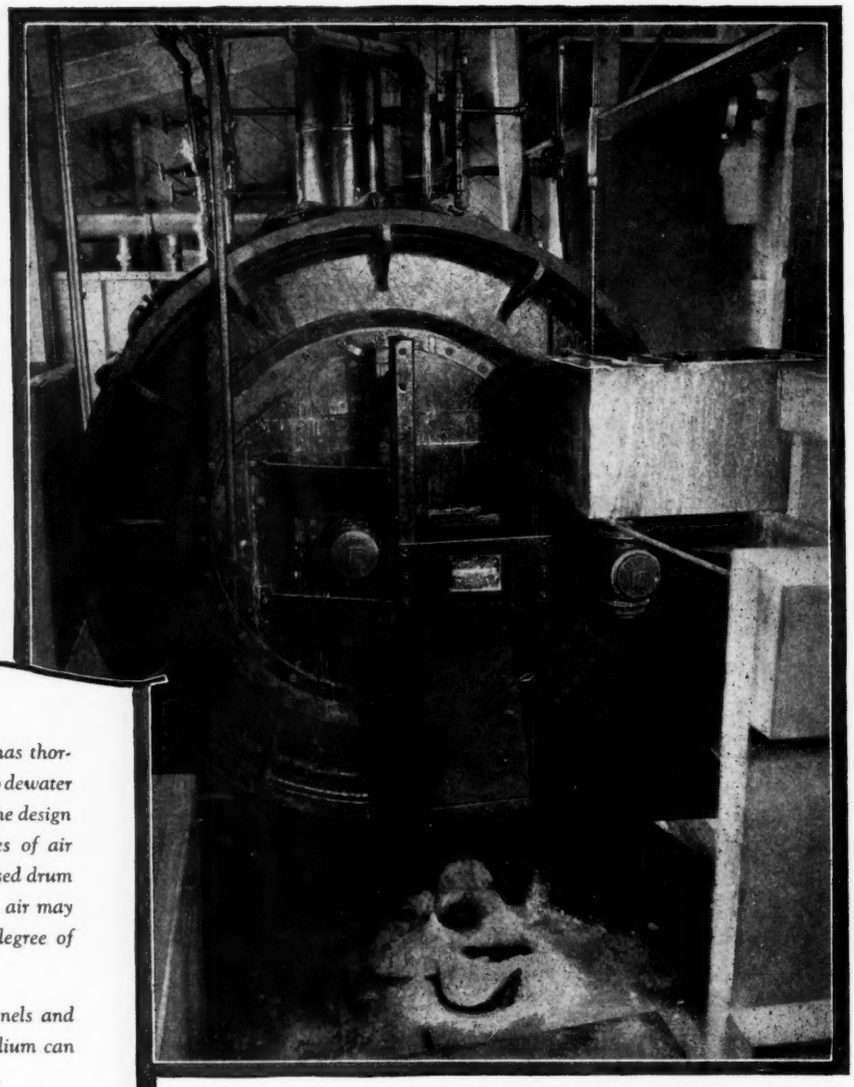

A Dorrco Salt Filter handling vacuum pan salt.

This new type of Salt Filter has thoroughly demonstrated its ability to dewater crystalline or coarse material. The design permits drawing large volumes of air through the filter cake. The closed drum serves as its own hood and the air may be preheated to give a high degree of crystal or surface drying.

The drum is made up of panels and any section of the filtering medium can be changed in a few moments.

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THE DORR COMPANY

ENGINEERS

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The Dorr Company, Ltd.
Abford House, Wilon Rd.,
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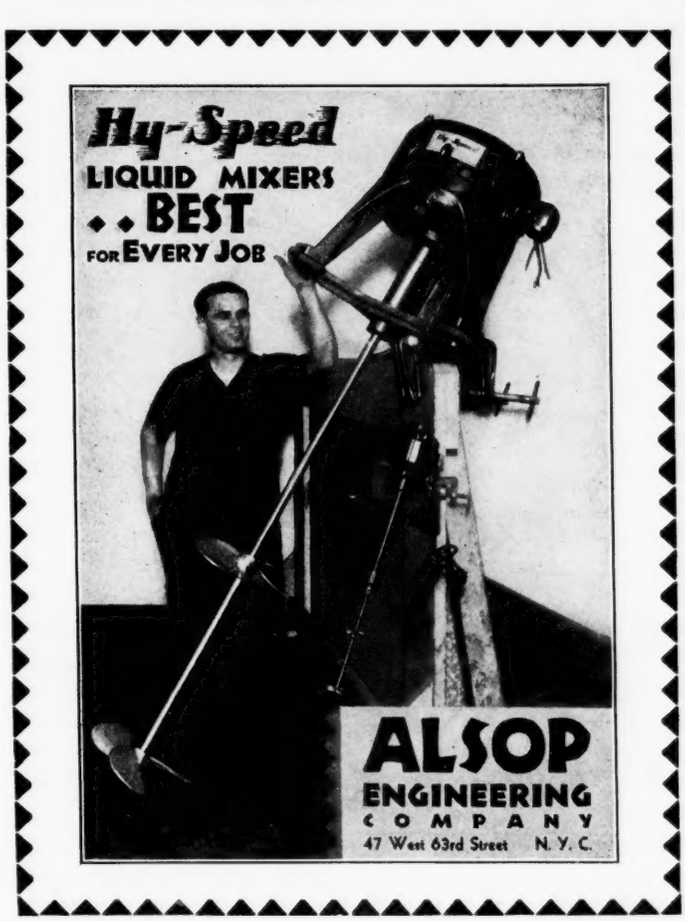
Societe Dorr et Cie
26 Rue de la Pepiniere

JOHANNESBURG, S. A.
E. L. Bateman
Locarno House.

Reduction of variables to a minimum sounds formidable but is really common sense. When a cost is out of line and either of two (or more) things may be the cause of it, each quite independently of the other, it is necessary to trace through and find out which one was really the cause so that action may be taken to correct it.

It frequently happens that two factors may be under the control of quite different men which, of course, makes the analysis so much more important. A simple example would be the use of materials which, we shall assume, would have a standard cost of $2.00 per ton in the final product. The actual cost may be $4.00 per ton and this may be brought about by using either one ton at four dollars per ton or two tons at two dollars or any combination of the two. Suppose the standard called for one ton at two dollars. If the first case, i. e. too high a price, purchasing department is responsible for the excessive cost, but if it were the use that was high then it is the fault of the operating department.

Many other examples could be cited and it is the function of cost accounting to so analyze the operations so that the individual elements are laid bare for study, each on its own merits and without confusion by other irrelevant factors. Incidently that is one of the great drawbacks to the old-fashioned systems of costs—too many net results were developed without sufficient means for analyzing them to show what made the wheels go round.



New Plant Construction

Texas Potash Corp., Dallas, plans construction of refinery for potash production from polyhalite ore in Midland county, Texas. Method by which this ore may be refined is reported discovered by Dr. E. P. Schock, director, bureau of industrial chemistry, University of Texas.

Southern Mineral Products Corp., subsidiary of Vanadium Corp., purchases 40 acres of mineral land in Amherst county, Va., and plans erection of new plant at that location, at initial cost of $1,000,000 including equipment.

Mathieson Alkali Works announces plans for expansion program at Saltville, Va., plant, consisting of new buildings and installation of new equipment for increasing output. About $2,000,000 will be expended for this purpose.

Bakelite Corp. plans construction of three-story addition to Bloomfield, N. J. plant to cost over $100,000. Company also plans erection of new plant at Bound Brook, N. J., whose initial units will cost over $250,000 including equipment.

Lautaro Nitrate Co., controlled by Anglo-Chilean Consolidated Nitrate Corp., expects new plant in Chile to be in operation by July 1, 1931. New plant, the largest in Chile, will operate by the Guggenheim process.

Consolidated Chemical Industries, Inc., San Francisco, plans construction of new multi-story unit to South San Francisco plant, estimated to cost about $300,000 including equipment.

Atmospheric Nitrogen Corp., Hopewell, Va., is enlarging office space at the plant. According to reports, the company plans to spend about $15,000,000 for plant expansions during this year.

Union Carbide & Carbon Co. plans construction of power dam and tunnel on New River, near Hawk's Nest, W. Va., at estimated cost of $4,500,000.

Arco Co., Cleveland, paints, plans construction of new plant at Los Angeles, consisting of three brick buildings totalling 16,500 feet of floor space.

Davison Chemical Co. approves plans for construction of new plant at Houston, Tex., to cost over $500,000 including machinery.

Viscose Co. of America plans erection of one-story addition to Lewiston, Pa., plant to cost over $250,000 with equipment.

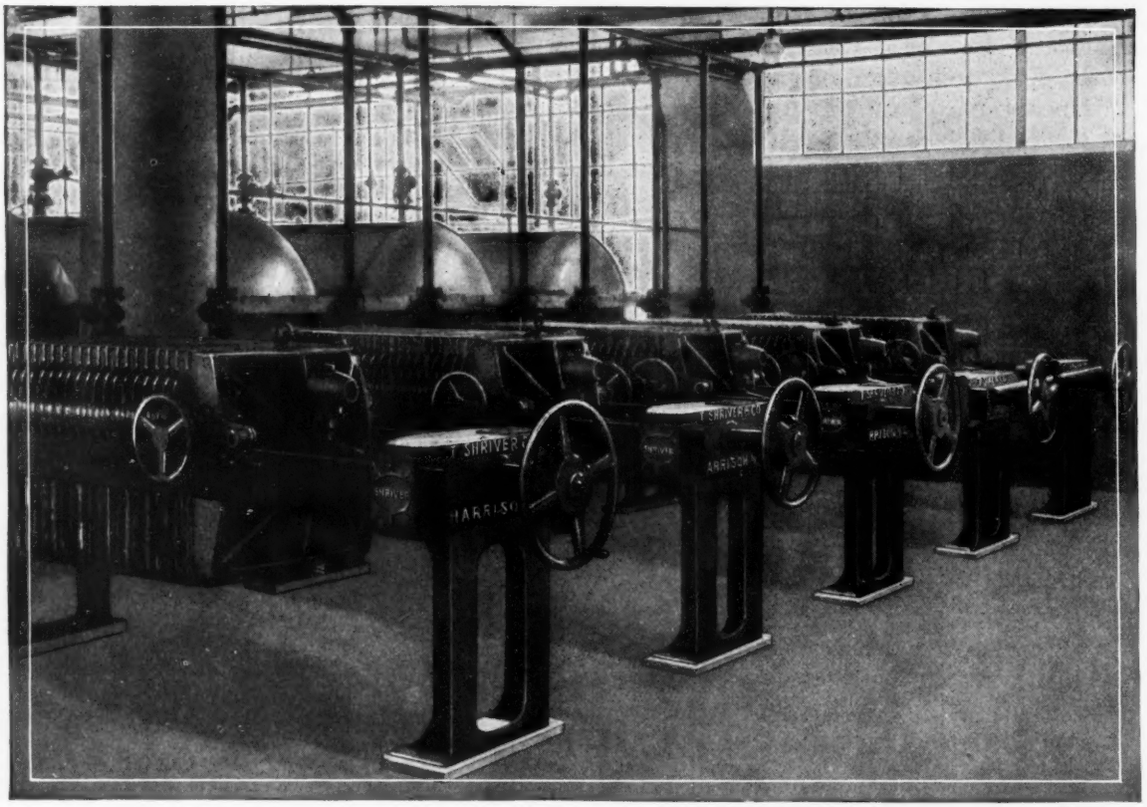
Selden Co. is constructing new two-story cooperage and storage building at Bridgeville, Pa., at estimated cost of $100,000.

General Ceramics Co., New York, plans construction of one-story addition to Keasby, N. J., plant to cost over $50,000.

Ozark Chemical Co., Tulsa, Okla., plans construction of one- and two-story plant addition, to cost about $45,000.

Consolidated Chemical Industries, Inc., is constructing a new glue plant in South San Francisco.

Three French chemical concerns, the Kuhlmann combine, and the St. Claire du Rhone and St. Denis companies, are the owners of the major portion of the stock in the Winnica Chemical Company, a new Polish manufacturer of synthetic dyes. The new concern has its headquarters in Warsaw. It is capitalized at 500,000 zloty.



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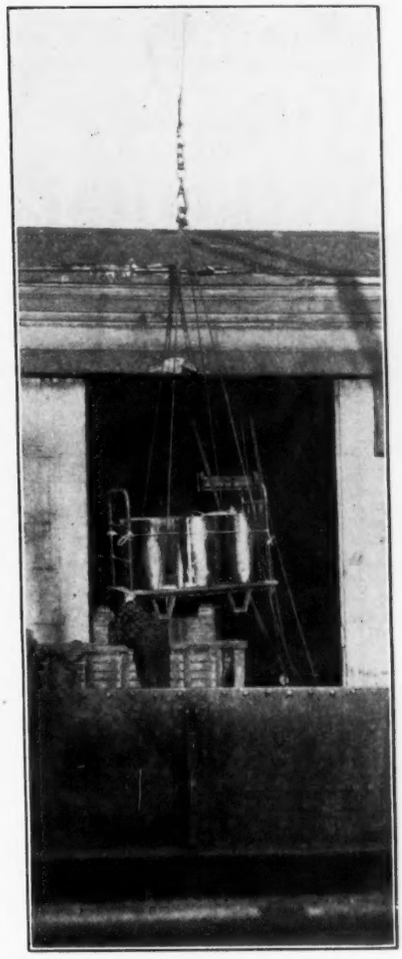
FILTER PRESSES FILTER CLOTH DIAPHRAGM PUMPS

Lowering Handling Costs with Skid Platforms

By C. H. Butler

Yale & Towne Manufacturing Co.



Transferring the shipment on skid platform from freight car to terminal

THE period of 1890 to 1910 was a revolutionary one in the handling of materials—particularly of the bulk type. The power shovel was developed; huge machines were created for loading and unloading railroad cars and ships; huge bridges began to span the widest rivers; cranes, conveyors and other devices came into existence. In the early years of the twentieth century engineers made rapid progress in developing new methods for handling materials in construction and an equally intensive development went on in methods of handling goods in process in factories.

Up to the time of the World War, little attention had been paid to handling finished goods. With the War, came the development of mass production. In order to maintain a constant supply for the ever-growing demand, it was necessary to eliminate a great deal of the human element in the handling of material. It was soon proved that "handling materials added cost to a commodity, but added little value."

Modern Handling Developments

To insure the production of a maximum number of units at the lowest possible cost, it was found necessary to employ methods of handling materials at the lowest possible cost.

It is often said that one of the first materials handling devices was created in the primitive days when man learned to roll stone by the use of a sledge—a flat structure made of lugs that dragged on the ground. This method of course, created a great deal of friction. Then man developed the sled, a top plate on two runners, to reduce the friction—but still there was too much friction. Then he produced one of his greatest inventions—the wheel—by cutting sections from logs, but these sections were not large enough; so he fabricated the spoke wheel, which finally was developed to its present high state of efficiency. But man was not satisfied. He still had to lift the load on and off the vehicle, whether of the wagon type or the low truck type. Modern developments showed that man was expending four times as much labor to load and unload, as he did to move it, especially on the short haul. Modern efficiency compelled elimination of this great waste of labor and time. It occurred to him to place the load on a sled or platform and by combining great leverage with the lifting device of the vehicle, he was able to eliminate four-fifths of his former labor and time.

The Lift Truck

The lift truck was then developed to move these skids or load platforms. At first the system was used in printing plants and paper goods' houses for handling flat stock goods. Gradually other plants began to use this method for handling a wide range of commodities.

Many of the more progressive firms then began an analytical study of the cost of handling material by

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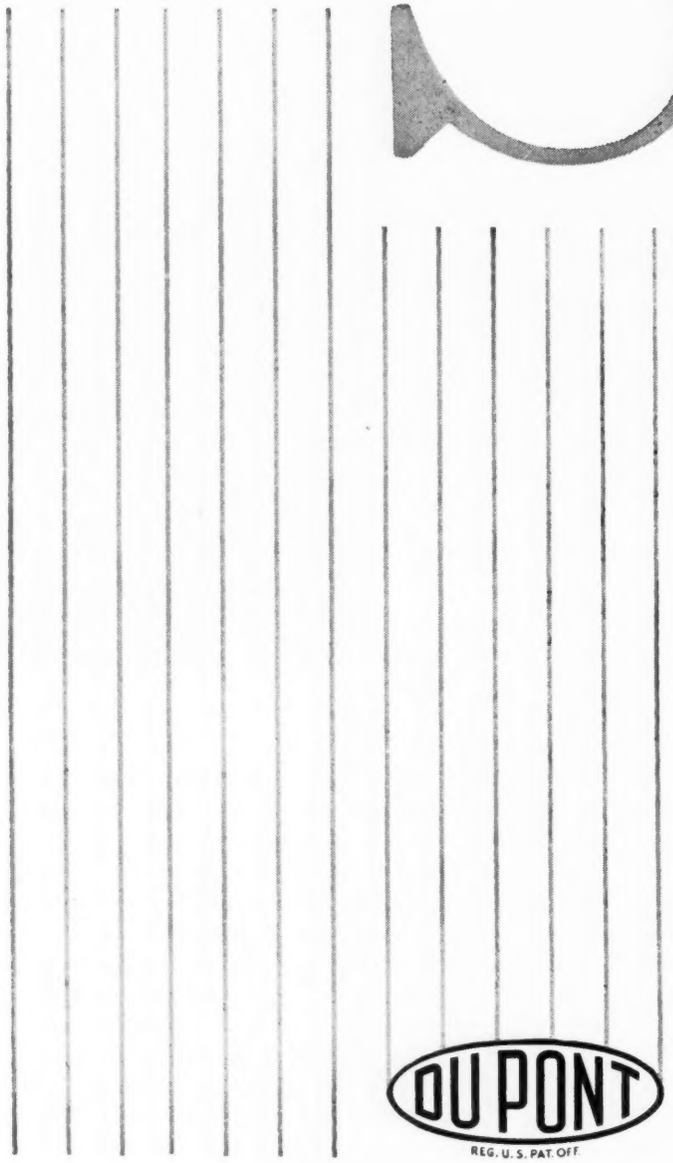

CONTINUOUS and constantly increasing production yields intermediates that are always uniform in quality and of the highest commercial purity. This is particularly true of:

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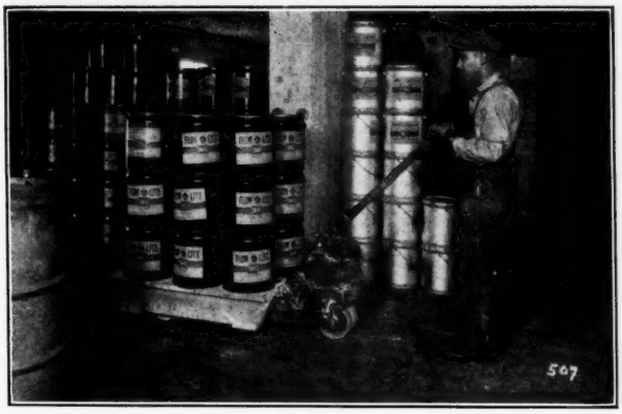
the use of lift trucks and skid platforms in comparison to the older methods of using four wheel type trucks. A large distributor of bottled goods in Chicago, found that with an investment of $450.00 an annual savings in time and labor of approximately $20,000 a year was made. It was found that one man with a lift truck and a group of inexpensive skid platforms could do the same work that formerly required five men using the ordinary four wheel type of truck.

Another large Philadelphia concern was confronted with the problem of economically handling paints, varnishes and similar products. They tried out the lift truck system and soon found that it saved them a minimum of $50.00 a day and at the same time increased their efficiency fully 100 per cent.



The primary use for the skid platform was in handling materials in the warehouse or plant.

To-day the lift truck system is used in all kinds of plants. Loads have increased steadily to a point where lift trucks are now made to handle capacities up to ten tons, although the average is two and one half to three tons. Once the ancient sled and the modern lift truck had been brought together, their use in combination spread so rapidly that it is estimated that to-day about nine million skids and a hundred and ten thousand lift trucks are in service in the United States.

Industrial Tractors and Trailers

During the period in which the skid platform and lift truck were extensively developed, a parallel development took place in connection with industrial tractors and trailers, particularly for use in railroad freight stations, warehouses and steamship terminals. Numberless forms of hand or power drawn trucks and trailers rapidly came on the market, all designed to reduce the time and labor cost of handling miscellaneous goods.

The progress of the railroads and terminals was nothing in comparison to that made by the industrial plants, for a study recently made by the Transportation Division of the Bureau of Foreign and Domestic Commerce covering miscellaneous commodities, showed that of every dollar spent to get these commodities from the final machine or factory process into the hands of the consumer ready for use, ten cents represented the actual water or rail transportation cost and ninty cents the cost of packing, handling, loading, unloading, rehandling, unpacking, etc., including the cost of packing materials.

This study, together with others of a specific nature, attracted wide attention on the part of engineers and executives, and indicated the various and untouched possibilities for saving money in this field. This knowledge together with the constantly varying opportunities for saving money in production processes further accelerated the effort to reduce cost in handling finished commodities.

It was obvious that, if the same degree of engineering, inventive and administrative genius were applied to distribution that already had been applied to production, the results would be similar to those accomplished in production.

Shipping on Skid Platforms

To this end there developed the practice of what is known as shipping goods on skid platforms. It was pointed out, and found to be practical too, that materials which could be handled economically within a plant by the use of lift trucks and skid platforms, could be handled just as economically in shipping from one plant to another. The paper industry, having effected savings up to 90 per cent over former methods of handling and production, were the first to extend the system to the shipment of goods on skid platforms by motor truck, rail and water. Other industries have since followed too, such as machinery manufacturers, automobile manufacturers, leather manufacturers, tin plate manufacturers, etc.

Common carriers such as railways and steamship companies, quickly recognized the great economies that could be effected for them in the quick loading and unloading of cars of finished or semi-finished products. The Department of Commerce soon recognized the magnitude of this project, and the following simplified standards of skid sizes and lift trucks were adopted:

> The skid platform should have two standard clearances of 8″ and 12″ (that is, the distance between floor and bottom of platform).
>
> The minimum distance between the runners should be 29″.

These dimensions being the most important for present requirements, permit a small number of lift truck sizes to handle a wide range of skid platform widths and lengths. Some commodities require different size platform tops, and the latter can be furnished without requiring a change in lift truck size. For example:

> A lift truck frame 18″ wide x 48″ long, under the above standards can handle platforms from 31″ to 36″ wide and from 48″ to 60″ long. Likewise, a lift truck 27″ wide x 60″ long can handle platforms 33″ to 44″ wide and from 60″ to 74″ long.

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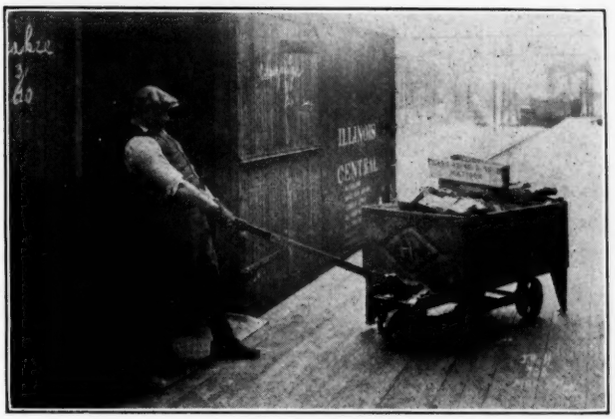
The user has a choice of platform tops. They may be corrugated pressed steel, hardwood tops with steel legs, or the ordinary all wood type, with various super structures including the box type, stake, rack or table.

Most commodities can be handled on the flat top, box, or stake type. Because of the present inside dimensions of cars, the common carriers have preferred two sizes, i. e. 33″ wide x 54″ long; and 42″ wide x 66″ long.

The specific advantages of the use of the skid platform method of shipping goods as outlined by the Department of Commerce through their Simplied Practice Recommendation No. 95 are as follows:— 1. It reduces labor and time costs from 50 to 90%



in loading and unloading freight cars; 2. Permits more rapid turnover of freight cars, requiring less cars for handling the same tonnage and reduces demurrage charges to a minimum; 3. Permits greater loading capacity of cars of a large variety of goods and lower handling costs; 4. Provides better packing and protects goods in transit, eliminating claims for such damage; 5. Due to quicker handling, it increases packing facilities at terminals, because more cars can be loaded and unloaded in less time.

In the meantime, as this progressive movement is extended, many questions are naturally being asked. For example many say, "What type of skid platforms will be used ?" "How will they be returned and accounted for ?" "Who will pay the cost of furnishing these skids ?"

Types of Shipping Platforms

The present and future of this movement is being provided for in the following manner. A durable, and returnable skid will be used by many manufacturers having subsidiary plants between which there is a large tonnage being handled constantly. In many cases where there is an accumulation of empties, a carload is made up to return to the original source of supply at a very low freight rate.

In this respect they travel under the accepted principles of economy as applied to the return of other empty containers such as poultry crates, oil drums, steel barrels, oyster containers, etc., They remain the property of the parent company and only circulate between the subsidiary plant. The more durable the platform the more practical and economical they will be.

Another type of skid platform that will undoubtedly be most popular is the non-returnable or dunnage skid. This is merely the nailed wooden platform. When used for shipping a commodity its cost is considered as part of the packing charges which usually range from $2.35 to $2.75. The cost is absorbed by the shipper, the same as the cost of a case or crate. In the case of one paper mill, a skid package costs $2.35 and contains two and one-half times the amount of paper formerly packed in a $4.00 case; the cost being in the ration of $2.35 to a former cost of $10.00. The principle of using the non-returnable skid is similar to that of the cost of other package goods. For example, a barrel of apples selling for $4.60 includes the cost of the barrel at 60c. The cost of the non-returnable skid which is included in the price of goods to the consumer is so insignificant because of the labor and time saved in unloading the car that to-day many consignees insist upon goods being shipped on skid platforms.

Finally, for shippers desiring to obtain all the advantages of skid shipment without ownership of skid platforms there is likely to be formed a national organization to provide skid platforms on a rental basis. The rental charge will probably vary from $1.15 to $1.50 to complete shipments from one point to another. If the loaded skid platforms are to be held in storage by the consignee, the latter will pay a nominal daily charge for such extra service. Such a controlling agency would have field representatives and warehouse stock at strategic points and could promptly render skid platform service upon call. As the platforms are released they are placed in warehouses for further call.

It is said that various commodities that can be shipped on skid platforms by common carriers will reach an annual capacity of 80,000,000 to 90,000,000 tons annually. It must be remembered, however, that this tonnage may be handled several times in the course of distribution, such as from warehouse to car, car to terminal, to warehouse, to motor truck, or in some cases transferred to steamship companies or other common carriers. The wide range of utility of the lift truck system will permit railroads to handle sacked goods, case goods, flat stock, machine units, small parts, barrels, bins, etc. efficiently on short hauls of 50 miles as well as long hauls of 4,000 miles.

The annual savings that will be made when this method becomes generally adopted according to the figures of the United States Department of Commerce will be between $3,000,000 and $4,000,000 annually. Every dollar thus saved will be clear gain, for as previously mentioned "The handling of materials adds to the cost, but adds nothing to the value."

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The Sta-Green Products Co., Inc., Wilmington, Del., fertilizers—Corp. Service Co., $25,000 pfd. 2,000 shs com.

M. M. Laboratories, Brooklyn, N. Y., chemicals—L. Jaffe, 26 Court St., 200 shs com.

Binghampton-Sano products Co., Binghamton, N. Y., chemicals—Yetter & Richardson, $10,000 pfd, 1,500 shs com.

Kraus, Max Asher, fertilizers—H. Wiesenthal 225 Broadway, N. Y., $20,000

The Kampfmueller Medicine Co., Cincinnati, Ohio, drugs, chemicals—American Guaranty & Trust Co., 10,000 shs com.

Heller & Merz Corp., Jersey City, manufacture chemicals—Corporation Trust Co., Jersey City, 1,000 shs com.

Bilhuber-Knoll Corp., Jersey City, chemist—Hans S. Meyn, New York City, $100,000.

E. Bilhuber, Inc., Jersey City, chemists—Hans S. Meyn, New York City, $40,000.

Harris-Steele, Inc., New York City, coal tar, rosins, coal tar products—United States Corporation Co., $250,000, 50,000 shs com.

Catalin Products Corp., chemicals—M. Seinfeld, 1440 Broadway, New York City, $30,000.

Crystillin Products Corp., chemicals—G. Sachs, 216 W. 100th St., New York City, $50,000.

Franklin Chemical Corp., Montclair, N. J., manufacture drugs—Arthur H. Bissell, Montclair, 3,000 shs com.

California Nitrate Co., Wilmington, Del., patents—Colonial Charter Co., $1,000,000.

Soapso Products Ltd. Toronto, Ont. 40,000 no par value shares chemicals, Robert C. Baird, Huson M. Harman, Clarence H. Hewgill.

Dominion Anilines & Chemicals Ltd., Toronto, Ont. $1,000 no par value shares, John B. Mulvey, Edwin A. Anglin, Frederick J. Hanna.

Public Service Commission approves new carload freight rates, effective April 15, 1930, on (ailicate of soda) minimum weight, in barrels or iron drums, 40,000 pounds, and in bags or in bulk 50,000 pounds. The new rates are effective on the Lehigh Valley, the New York Central, east and west divisions; the Pennsylvania, and the West Shore railroads, and represent reductions of 1½c to increases of ½c per hundred pounds.

Alsop Engineering Co., New York, announces removal of offices to 39 West 60 st., that city.

STATEMENT OF THE OWNERSHIP, MANAGEMENT, CIRCULATION, ETC., REQUIRED BY THE ACT OF CONGRESS OF AUGUST 24, 1912.

Of Chemical Markets, published monthly at Pittsfield, Mass., April 1, 1930.
State of New York, County of New York—ss.

Before me, a notary public in and for the State and county aforesaid, personally appeared Williams Haynes, who, having been duly sworn according to law, deposes and says that he is the Publisher of the Chemical Markets, and that the following is, to the best of his knowledge and belief, a true statement of the ownership, management (and if a daily paper, the circulation), etc., of the aforesaid publication for the date shown in the above caption, required by the Act of August 24, 1912, embodied in section 443, Postal Laws and Regulations, printed on the reverse of this form, to wit:

1. That the names and addresses of the publisher, editor, managing editor, and business managers are: Publisher, Williams Haynes, 25 Spruce St., New York, N. Y.; Editor, none; Managing Editor, Elmer F. Sheets, 25 Spruce St., New York, N. Y.; Business Manager, William F. George, 25 Spruce St., New York, N. Y.

2. That the owner is: (If the publication is owned by an individual his names and address, or if owned by more than one individual the name and address of each, should be given below; if the publication is owned by a corporation the name of the corporation and the names and addresses of the stockholders owning or holding one per cent. or more of the total amount of stock should be given.) Chemical Markets, Inc.; Williams Haynes, 25 Spruce St., N. Y. C.; and W. F. George, 25 Spruce St.; N. Y.C.

3. That the known bondholders, mortgagees, and other security holders owning or holding one per cent. or more of total amount of bonds, mortgages, or other securities are: (If there are none, so state.) None.

4. That the two paragraphs next above, giving the names of the owners, stockholders, and security holders, if any, contain not only the list of stockholders and security holders as they appear upon the books of the company but also, in cases where the stockholder or security holder appears upon the books of the company a trustee or in any other fiduciary relation, the name of the person or corporation for whom such trustee is acting, is given; also that the said two paragraphs contain statements embracing affiant's full knowledge and belief as to the circumstances and conditions under which stockholders and security holders who do not appear upon the books of the company as trustees, hold stock and securities in a capacity other than that of a bona fide owner; and this affiant has no reason to believe that any other person, association, or corporation has any interest direct or indirect in the said stock, bonds, or other securities than as so stated by him.

5. That the average number of copies of each issue of this publication sold or distributed, through the mails or otherwise, to paid subscribers during the six months preceding the date shown above is (This information is required from daily publications only.)

Williams Haynes, Publisher.

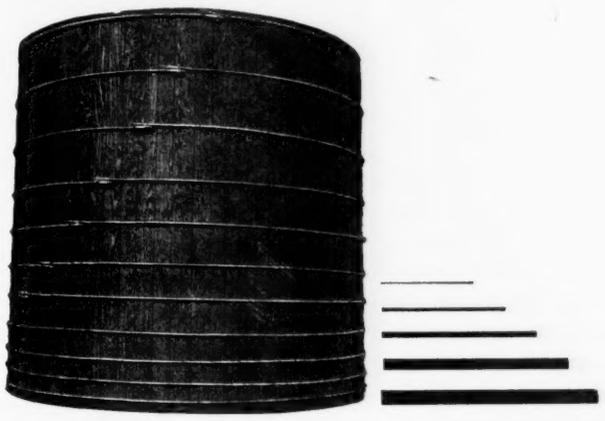
Sworn to and subscribed before me this 19th day of March, 1930. Margaret A. Burt (Notary Public, N. Y. Co. Clerk's No. 70 N. Y. Reg. No. 32B2. Commission expires March 3, 1932.)

(Seal.)

I. C. C. Suspends Higher Chemical Rates

Proposed increased freight rates on chemicals, acids and dyestuffs on practically all railroads from Eastern and Southern origins to Southern destinations are suspended until October 15, by the Interstate Commerce Commission. The new rates, published to take effect March 15, would cancel all less-than-carload and "any quantity" rates on these products, leaving in effect the class rates which are generally higher. Carload rates would not be effected. The commission has docketed an investigation of the rates as investigation and suspension No. 3434.

General American Tank Car Corp. is awarded contract by Navy Department for fleet of tankcars for transportation of helium for use in dirigible airships. The cars, weighing more than 200,000 pounds each, will be largest ever built.



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117 Liberty Street
New York, N. Y.

Chemical Facts and Figures

Du Pont Announces Agreement To Acquire Roessler & Hasslacher

No Important Changes Planned In Administration of New Subsidiary—New Company To Be Incorporated To Retain Roessler & Hasslacher Name—Stockholders Meet This Month to Approve Terms For Sale of Entire Business and Assets.

E. I. du Pont de Nemours & Co., Inc., announces agreement with Roessler & Hasslacher Chemical Co., which, if approved by stockholders of latter company, provides for acquisition by the du Pont company of the entire assets and business of the Roessler & Hasslacher Chemical Co. No important changes are contemplated in the administration of this company, which will continue its activities as before. A new company will be incorporated for the purpose of retaining the Roessler & Hasslacher name and operating the new acquisition.

Roessler & Hasslacher Chemical Co., organized in 1882, operates plants at Perth Amboy, N. J., Niagara Falls, N. Y., St. Albans, W. Va., and El Monte, Calif. A subsidiary, Mexican Roessler & Hasslacher Chemical Co., operates in Mexico, and the company holds a one-third interest in the Niacet Chemicals Corp. Sales agencies are maintained in Boston, Philadelphia, Chicago, Pittsburgh, Cleveland, Baltimore, Newark, Kansas City, San Francisco, and New Orleans.

In its annual report for 1929, Roessler & Hasslacher Chemical Co. shows total assets of $11,684,438 and a surplus (undistributed profits) of $4,131,695 at the end of 1929. This compares with total assets of $15,531,554 and a surplus of $2,525,543 at the end of 1928. Company has an authorized capitalization of 150,000 shares of common stock of which, 113,966 shares, $4,119,558, are outstanding. Company's gross operating profit and its income from investments in 1928 totaled $4,694,436 and its net income $1,409,680.

Officers of the company are as follows:—president, H. R. Carveth; first vice-president, Philip Schleussner; second vice-president, Milton Kutz; assistant vice-presidents, Mortimer J. Brown and Colby Dill; treasurer, Albert Frankel; assistant treasurer, August Heuser; secretary, Philip Schleussner. Directors are chairman, William A. Hamann; Mortimer J. Brown, H. R. Carveth, Colby Dill, Albert Frankel, James M. Gifford, Milton Kutz, Philip Schleussner, and George E. Warren.

Selden Co.'s Phthalic Patent Is Declared Invalid by U. S. Court

Selden Co.'s patent No. 1,647,317 on a process of carrying on catalytic conversions is declared invalid by the United States District Court in St. Louis, in a decision dated March 4. The action in which this decision was given was instituted by the Selden Co. in November, 1927, against the Monsanto Chemical Works, and alleged that the latter company's phthalic anhydride process infringed the Selden patent.

In its opinion, the Court stated that, "it is quite difficult to see that there is anything bordering on invention exhibited in the patent in suit."

"The process of the patent is thus shown to have been in common commercial use, and exemplified in many patents in the same and analogous arts."

"In our judgment the patent is so clearly lacking in invention that there is no occasion to consider other matters presented."

Dr. Milton C. Whitaker Heads New American Cyanamid Subsidiary

Dr. Milton C. Whitaker announces his retirement from private consulting practice to become associated with the executive staff of the American Cyanamid Co., as president, Catalytic Process Corp., a new subsidiary. This company will consolidate the various contact sulfuric acid interests of the parent company and its subsidiaries and direct the development and installation of plants and processes heretofore owned by Selden Chemical Co., Calco Chemical Co., Chemical Construction Co., and American Cyanamid Co. Officers of the Catalytic Process Co., in addition to Dr. Whitaker, are Dr. W. S. Landis, vice-president; W. P. Sturtevant, secretary; and R. C. Gaugler, treasurer; Offices of the company are located at 535 Fifth ave., New York.

Dr. Milton C. Whitaker has been engaged in private consulting practice in New York since 1927, at which time he resigned as president, U. S. Industrial Chemical Co., and vice-president, U. S. Industrial Alcohol Co. During that time, he has also been a member of the board of consulting editors of CHEMICAL MARKETS. He was president of the U. S. Industrial Chemical Co. for ten years, previous to which he was for six years professor of chemical engineering, Columbia University, and seven years in charge of the plants of the Welsbach Co. He received the Perkin Medal in 1923; has been a director of the American Chemical Society; past president of the American Institute of Chemical Engineers and editor of "Industrial & Engineering Chemistry." He is also a member of the Society of Chemical Industry, Delta Tau Delta, Phi Beta Kappa, Sigma Psi, Tau Beta Phi, the Chemists' Club and the University Club.

American Cyanamid Co. also announces acquisition of Heller & Merz Co., Newark, manufacturers of dyestuffs since 1869. Company will continue to operate under its own name and with the same personnel, although its operations will be closely coordinated with those of the Calco Chemical Co., Inc. Orders and inquiries may be directed towards any of the offices or branches of either the Heller & Merz or the Calco company. August Merz and Eugene Merz become vice-presidents of the later organization.

Bebie Retires From Monsanto

Dr. Jules Bebie, director of research, Monsanto Chemical Works, retires from his duties with that company after twenty-five years of service, and is succeeded by Dr. L. P. Kyrides.

Dr. Bebie was born at Zurich, Switzerland, April 9, 1877, and received his education in chemical engineering. He was placed in charge of plant operations at the Monsanto Chemical Works in 1905, after four years with the Chemical Works at Brugg, Switzerland. In later years he became director of research for the company. He is a member of the American Chemical Society, the American Institute of Chemical Engineers, the American Drug Manufacturers' Association, and the Missouri Athletic Club.

THE EXTRA ADVANTAGE

An extra advantage in purchasing may be the stimulus that enables your product to outdistance competition.

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The feature of quality is aside from the point. Excellence always has characterized E B G Liquid Chlorine since the pioneer days of the organization.

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Liquid Chlorine

ELECTRO BLEACHING GAS CO.

Plant: Niagara Falls, New York
Main Office: 9 E. 41st St., New York

PIONEER MANUFACTURERS OF LIQUID CHLORINE

Personal and Personnel

R. N. Chipman, Chipman Chemical & Engineering Co.; A. H. Kent, Grasselli Chemical Co.; and A. W. Steudel, Sherwin-Williams Co.; are appointed members of a committee representing the Agricultural Insecticide & Fungicide Manufacturers' Association, to oppose the placing of a duty on arsenic.

Dr. Samuel E. Sheppard, assistant director, research department, Eastman Kodak Co., Rochester, is awarded the William H. Nichols Medal, New York section, American Chemical Society, at a joint meeting of the various chemical societies in the Chemists' Club, New York, March 14.

Harry L. Derby, president, Kalbfleisch Corp., and chairman, Tariff Committee, National Manufacturers' Association, and John E. Edgerton, president of the association, call upon President Hoover, March 26, to discuss the tariff bill.

W. S. Carpenter, vice-president in charge of finance E. I. du Pont de Nemours & Co., succeeds Irenee du Pont as chairman, finance committee. The latter continues in his capacity as vice-chairman of the board.

L. V. Redman, vice-president and director of research, Bakelite Corp., addresses Detroit regional meeting, American Society for Testing Materials, on the subject, "Phenol Resinoids and the Automobile."

H. R. La Towsky is appointed assistant sales manager, chemical specialties division, E. I. du Pont de Nemours & Co., succeeding M. J. Powers, resigned.

Dr. Robert F. Ruttan, former president, Society of Chemical Industry, and for forty years professor of chemistry, McGill University, dies February 19, aged 75.

Lord Melchett, chairman, Imperial Chemical Industries, Ltd., gives £1,000 to the Royal College of Surgeons, London, for research work.

Leon V. Quigley, technical editor, Bakelite Corp., addresses February meeting, North Shore Men's Club, Long Island, on "Chemistry in the Nation's Business."

Dr. G. C. Clayton, member of the board of directors, Imperial Chemical Industries, Ltd., is nominated as president, British Institute of Chemistry, succeeding Prof. Arthur Smithells.

Dr. Franz C. Waldecker, research chemist, and formerly director of research, H. A. Metz Laboratories, New York, dies in London, Eng., March 31, aged 48.

Dr. Ernest Watzl, chemist and inventor of a process for water purification, who formerly lived in Cleveland, dies in Vienna, Austria, March 24, aged 40.

Nicholas F. Brady, prominent financier and a member of the board of directors, Union Carbide & Carbon Corp., dies in New York, March 27, aged 51.

George Eastman, chairman of the board, Eastman Kodak Co., urges advertising to restore trade in statement issued March 19.

E. V. Peters resigns as director and vice-president in charge of sales, Tubize Artificial Silk Co. of America.

Edmund Gillet, of the French Comptoir des Textiles Artificiels, is appointed a director of the Montecatini chemical group.

Dr. Richard Weidlich, member of the executive committee, I. G. Farbenindustries, resigns March 7.

A. A. Holmes Leaves as Vice-President of Farm Supplies

Andrew A. Holmes, sales manager, American Potash & Chemical Corp., resigns from his position with that company to become vice-president in charge of agricultural chemical advertising for FARM SUPPLIES, a trade paper for farm supply dealers. He had been associated with the American Potash & Chemical Co. since 1922, and is widely known throughout the chemical and fertilizer industries for his successful efforts in marketing potash and borax for that company.

He was born in Rome, Ga., July 24, 1880, and educated at the University of North Carolina and Cornell University, receiving the degree of B. S. from the former in 1901, and that of M. E. from the latter in 1904. Until 1922 when he became associated with the American Potash & Chemical Corp., his activities were chiefly confined to the engineering fields. He is a member of the American Chemical Society and of the American Institute of Chemical Engineers; of Kappa Sigma; and of the Chemists' Club, New York; the University Club, Chicago; and the Roselle Golf Club.

Nichols' Will Gives $1,000,000 to Charity

Dr. William H. Nichols' will filed for probate March 14, indicated that the late chairman of the board, Allied Chemical & Dye Corp., had left more than $1,000,000 to be inherited by nineteen public institutions.

The largest institutional legacy is $250,000 to the Polytechnic Institute of Brooklyn, which Dr. Nichols attended for three years as a youth, and of which he was vice-chairman of the board. The American Chemical Society, of which he was an incorporator and a former president, receives $50,000.

After specific legacies of $795,000 to eighteen organizations and $47,000 to two employees and his former barber, Dr. Nichols left half of his residue estate to New York University for the maintenance of the Nichols Chemical Laboratory, which he gave to the University in 1927. His will requested that the bequest be used to keep the laboratory "at all times in good order and repair and well-equipped."

The other half of Doctor Nichols' residuary estate, his personal effects and certain real estate holdings are divided among members of his family.

Walter H. Cottingham, chairman of the board, Sherwin-Williams Co. of Canada, Ltd., and Sherwin-Williams Co. of America, dies at his home in Maindenhead, Berkshire, Eng., March 12, aged 64. He had retired from active business nine years ago

Edward J. Lavino, chairman of the board, E. J. Lavino & Co., chemical importer and dealer, Philadelphia, dies March 3, aged 77.

Adolph Hirsch, president, Adolph Hirsch & Co., New York, importer of waxes and tanstuffs, dies March 5, aged 69.

Joseph Lang, veteran explosives salesman, E. I. du Pont de Nemours & Co., Inc., dies March 6, aged 75.

Andrew J. Elliott, president, Neponset Color Co., dyestuffs, Hyde Park, Boston, dies March 2, aged 56.

Dr. Frank A. Wilder, founder of Southern Gypsum Co., dies at Abington, Va., March 11, aged 68.

1845

Isaac Tyson tired of the delay occasioned by shipping his chrome Ore to Liverpool to be converted into Bichromate, opened the first chrome factory in America in 1845.

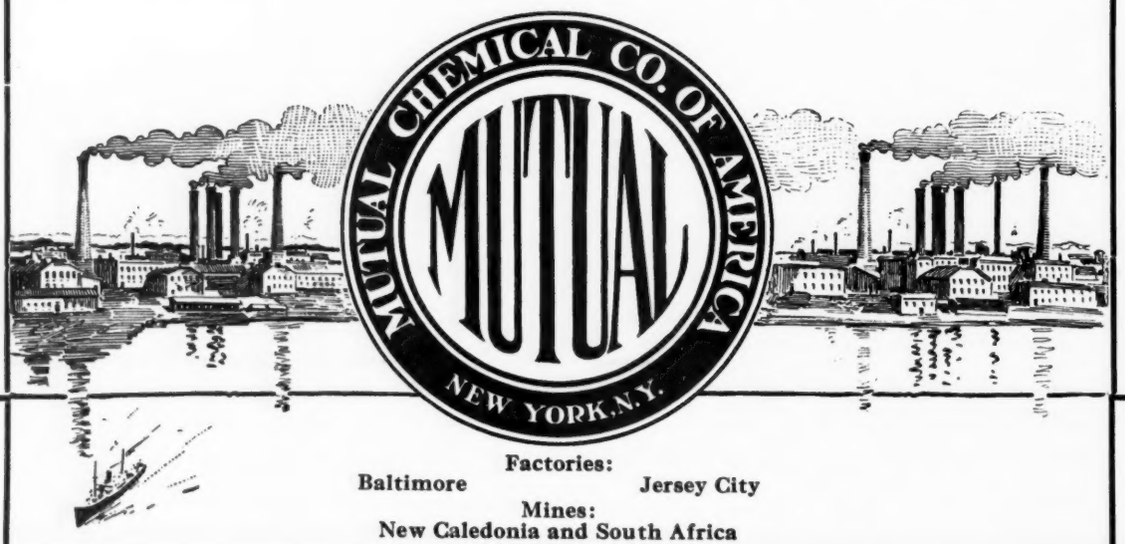
The present Baltimore Works of the Company stands on the same location in Baltimore and is the largest Bichromate plant in the World.

Bichromate of Soda

Bichromate of Potash

Chromic Acid

Oxalic Acid



Factories:
Baltimore **Jersey City**
Mines:
New Caledonia and South Africa

News of the Companies

Atmospheric Nitrogen Corp., Hopewell, Va., announces following changes in personnel: F. C. Clark, general manager; G. R. Sandford, assistant general manager; F. A. Ernst, production manager; J. J. O'Leary, assistant production manager; L. L. James, general superintendent, Hopewell plant; Dr. M. F. Fogler, assistant general superintendent, Hopewell plant. G. C. Tufts, vice-president, and W. H. Kniskern, director of operations, also have offices in Hopewell.

Newport Chemical Works announces that Burton T. Bush, long associated with the aromatic chemical industry, has become associated with the company. For the present, he will work with Dr. E. H. Killheffer, president, in studying requirements of the industries interested in aromatic materials to determine how much their requirements may be met by the research and manufacturing facilities of the Newport organization.

Merrimac Chemical Co.'s plant at South Everett, Mass., is damaged by fire, March 14, to the extent of $500,000. It was announced by Edgar M. Queeny, president of the parent organization, Monsanto Chemical Works, that damage was fully covered by insurance and that the fire had occasioned no suspension of services to customers.

Hercules Powder Co., elects following officers: president, R. H. Dunham; vice-presidents, J. T. Skelly, T. W. Bacchus, N. P. Rood, C. D. Prickett, G. G. Rheuby, and C. A. Higgins; treasurer, C. C. Hoopes; and secretary, E. B. Morrow.

Dry Ice Corp. of America closes long-term contract with Commercial Solvents Corp., which makes available to the former 120 tons of pure carbon dioxide daily for the manufacture of "dry ice."

Roessler & Hasslacher Chemical Works, New York, is awarded an income and profits tax refund of $45,506 by the Bureau of Internal Revenue. Taxes for 1920 were involved.

Jungmann & Co., New York, announces removal of offices to 155 Sixth ave., with receiving and delivery departments at 240 Spring st.

American Commercial Alcohol Corp. elects Warren W. Foster, formerly Judge of General Sessions, New York City, to board of directors.

American Zinc Institute, New York, announces removal of offices to Suite 1562, Lincoln Building, that city.

Michigan Alkali Co., New York, announces removal of general sales offices to 10 East 40 st., that city.

Innis, Speiden & Co., New York, appoints S. E. Wardell Advertising Agency to direct its advertising account.

Harshaw Chemical Co., Cleveland, announces removal of executive offices in that city to 1954 East 97 st.

Allied Chemical & Dye Corp., New York, receives a tax abatement of $85,231 from the Federal government.

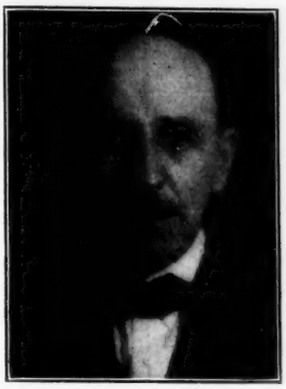
Victor Chemical Works, New York, announces removal of offices to 220 East 42 st., that city.

Compressed Gas Manufacturers' Association announces removal of offices to 110 West 40 st., New York.

Fort Pitt Chemical Co., Pittsburgh, announces removal into its own buildings at Twenty-sixth and Smallman sts.

American Chemical Society Holds Seventy-ninth Meeting at Atlanta

American Chemical Society holds its seventy-ninth meeting at Atlanta, Ga., April 7-11. Following registration, a council meeting, a dinner and reception, followed by dancing, at the Biltmore Hotel, on Monday, April 7, the meeting got actively under way on April 8, with two general sessions.



Wm. McPherson, President, American Chemical Society

A symposium on "Analytical Chemistry" was held under the auspices of the Division of Physical and Inorganic Chemistry, H. H. Willard, chairman. Among the speakers were H. H. Willard on "Modern Trends in Analytical Chemistry; George L. Clark, "X-Ray in Analytical Chemical Research;" C. C. Nitchie, "Spectral Analysis;" Clyde W. Mason, "Microscopic Methods in Analytical Chemistry;" victor K. La Mer, "Modern Theories of Solution;" and Harry B. Weiser, "Colloidal Behavior in Analytical Chemistry."

A general meeting under the auspices of the Division of Industrial and Engineering Chemistry, Robert E. Wilson, chairman, featured chemistry's advance in the South. Among the speakers were S. W. McCallie, "Georgia's Geological Researches;" B. S. Brown, "Naval Stores;" C. E. Mullin, "America's Synthetic Fibre Industry;" W. D. Munson, "Manufacture of Chemical Cotton;" R. S. Hancock and H. E. Kaiser, "Purification of Wood Rosin;" Thomas Midgely, Jr., and Albert L. Henne, "Organic Fluorides as Refrigerants;" Lauren B. Hitchcock, "Fixation of Nitrogen in Virginia" and Cellulose in Virginia;" and R. E. Hussey and P. C. Scherer, "Rayon in Virginia."

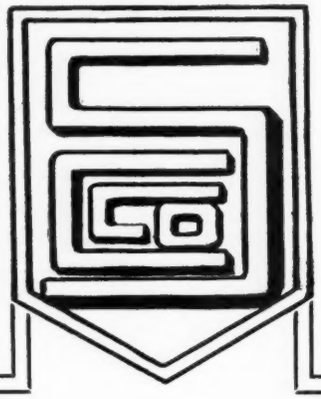
The afternoon of April 8 was given over to divisional meetings, while in the evening a complimentary dinner and dance was held in the Shrine Mosque.

Both morning and afternoon of April 9 were devoted to divisional meetings, followed by group luncheons and dinners. In the evening, Harrison E. Howe, editor, *Industrial and Engineering Chemistry*, addressed a public meeting at the Shrine Mosque, on "Chemistry Comes South." Divisional meetings were concluded on the morning of April 10, while in the afternoon the Coca-Cola Co. gave a complimentary barbecue at the Druid Hills Golf Club. On the closing day of the meeting, various industrial plants in and near Atlanta were visited.

Divisional meetings were all held in the First Baptist Church Annex. The various groups participating were as follows: Division of Agricultural and Food Chemistry, R. C. Roark, chairman, H. A. Schuette, secretary; Biological Chemistry, D. B. Jones, chairman, I. G. Macy, secretary; Cellulose Chemistry, E. C. Sherrard, chairman, C. J. Staud, secretary; Chemical Education, J. N. Swan, chairman, R. A. Baker, secretary; Gas and Fuel Chemistry, H. C. Porter, chairman, O. O. Malleis, secretary; History of Chemistry, L. C. Newell, chairman, T. L. Davis, secretary.

Division of Industrial and Engineering Chemistry, R. E. Wilson, chairman, E. M. Billings, secretary; Medicinal Chemistry, A. E. Osterberg, chairman, A. D. Holmes, secretary; Organic Chemistry, F. C. Whitmore, chairman, A. J. Hill, secretary; Paint and Varnish Chemistry, J. S. Long, chairman, P. R. Croll, secretary; Petroleum Chemistry, J. B. Hill, chairman, C. R. Wagner, secretary; Physical and Inorganic Chemistry, W. V. Evans, chairman, H. H. Willard, secretary; Rubber Chemistry, S. Krall, chairman, H. E. Simmons, secretary; Sugar Chemistry, W. L. Owen, chairman, J. K. Dale, secretary.

STAUFFER
CHEMICAL COMPANY



CARBON
TETRA
CHLORIDE

CREAM OF TARTAR

CAUSTIC SODA

SULPHUR
GROUND REFINED

BORAX

CARBON BISULFIDE

NITRO CELLULOSE

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MURIATIC

TARTARIC
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CHICAGO, ILL. - CARBIDE & CARBON BLDG.
SAN FRANCISCO, CAL. - 624 CALIFORNIA ST.
LOS ANGELES, CAL. - RIVES-STRONG BLDG.

Tariff Revision Bill Passes Senate and Goes to Conference Committee

Tariff revision bill is passed by Senate, March 24, by vote of 53 to 31, and goes to a committee of conference with the House, which will draw up a compromise of the disagreeing amendments of the two bodies. After this, the conference report must be accepted by both houses or returned to conference with instructions on certain paragraphs. It is estimated that it will be the end of May or beginning of June before the bill is ready for the President.

The Senate made 1,112 changes in the rate section of the bill and 141 changes in the administrative sections, and these differences must be accepted by the house or receded from by the senate. According to Reed Smoot, chairman, Senate Finance Committee, the senate bill imposes an average ad valorem equivalent duty of 38.99 per cent, while the house bill carries an average duty of 43.15 per cent and the 1922 act averages 34.61 per cent. Schedule I, which includes chemicals, oils and paints, had an ad valorem equivalent of 31.82 per cent as passed by the house and an average of 30.95 per cent as passed by the Senate, while in the present law the average is 28.92 per cent.

A comparison of the rates on representative items included in Schedule I, is as follows:

	Rate of Duty		
		Hawley-Smoot	
Commodity	*Fordney-McCumber Tariff, 1922*	*House Bill*	*Senate Bill*
Acids and acid anhydrides:			
Acetic acid containing not more than 65% acetic acid (lb.)	¾c.	¾c.	2c.
Acetic acid containing more than 65% acetic acid (lb.)	2c.	2c.	3c.
Acetic anhydride (lb.)	5c.	5c.	2½c.
Boric acid (lb.)	1½c.	1½c.	1c.
Citric acid (lb.)	17c.	18c.	17c.
Formic acid (lb.)	25%	4c.	25%
Tannic acid, tannin and extracts of nutgalls:			
Containing less than 50% tannic acid (lb.)	4c.	6c.	4c.
Cont'g 50% or more and not medicinal (lb.)	10c.	12c.	10c.
Containing 50% or more and medicinal (lb.)	20c.	22c.	18c.
Tartaric acid (lb.)	6c.	8c.	8c.
Arsenious acid or white arsenic (lb.)	Free	Free	2c.
Sulfide of arsenic (lb.)	Free	Free	2c.
Arsenic acid (lb.)	3c.	3c.	3c.
Gallic acid (lb.)	8c.	10c.	6c.
Nitric acid (lb.)	Free	½c.	Free
Oxalic acid (lb.)	6c.	6c.	6c.
Phosphoric acid, containing less than 80% phosphoric acid (lb.)	2c.	2c.	2c.
Phosphoric acid, containing 80% or more phosphoric acid (lb.)	2c.	3½c.	2c.
Pyrogallic acid (lb.)	12c.	15c.	10c.
Chromic acid (lb.)	Free	25%	1½c.
Oleic acid or red oil (lb.)	1½c.	25%	1½c.
Stearic acid (lb.)	1½c.	25%	25%
Acetone and ethyl methyl ketone and their homologues, and acetone oil (lb.)	25%	25%	20%
Alcohol:			
Hexyl (lb.)	25%	6c.	25%
Calcium arsenate	25%	Free	Free
Aluminum sulfate, alum cake or aluminous cakes:			
Containing not more than 15% alumina and more iron than the equivalent of 1-10 per cent ferric oxide (lb.)	1/10%	1/10c.	1/4c.
Ammonium compounds:			
Ammonium carbonate and bicarbonate (lb.)	1½c.	2c.	2c.
Antimony compounds:			
Oxide (lb.)	2c.	2c.	½c. to 4c.
Argols, tartar and wine lees:			
Containing less than 90% potassium bitartrate	5%	Free	Free
Calcium tartrate, crude	5%	Free	Free
Barium compounds:			
Barium chloride (lb.)	1½c.	2c.	2c.
Barium oxide (lb.)	25%	2½c.	2½c.
Calcium carbide (lb.)	1c.	1c.	1c.
Calcium oxalate (lb.)	25%	4c.	4c.
Mercurial preparations:			
Calomel (lb.)	45%	22c.+25%	22c.+25%
Corrosive sublimate (lb.)	45%	22c.+25%	22c.+25%
Other mercurial preparations (lb.)	45%	22c.+25%	22c.+25%
Mercuric oxide (lb.)	45%	22c.+25%	22c.+25%
Carbon tetrachloride (lb.)	2½c.	2½c.	1c.
Chloroform (lb.)	6c.	6c.	4c.
Casein and casein mixtures:			
Casein or lactarene (lb.)	2½c.	2½c.	5½c.
Mixtures of which casein or lactarene is the component material of chief value, n.s.p.f. (lb.)	20%	2½c.	5½c.
Urea (lb.)	35%	Free	Free
Ethyl hydrocupreine salts and compounds thereof (new) (ounce)			20c.
Diethylbarbituric acid, salts and compounds (lb.)	25%	$2.50	$2.50
Metacresol, orthocresol, paracresol, 90% or more pure (lb.)	7c.+40%	3½c.+20%	3½c.+20%
Coal-tar products, n. s. p. f. (lb.)	7c.+40%	3½c.+20%	3½c.+20%
Dyes and finished coal-tar chemicals:			
Colors, dyes and stains—			
Synthetic indigo (lb.)	7c.+45%	7c.+45%	3c.+20%
Sulfur black (lb.)	7c.+45%	7c.+45%	3c.+20%
Ethers and esters:			
Diethyl sulfate (lb.)	10c.	25%	25%
Dimethyl sulfate (lb.)	10c.	25%	25%
Butyl acetate (lb.)	25%	7c.	7c.
Amyl acetate (lb.)	25%	25%	7c.
Formaldehyde solution or formain (lb.)	2c.	2c.	1½c.
Hexamethylenetetramine (lb.)	25%	25%	11c.
Magnesium compounds:			
Sulfate or Epsom salts (lb.)	½c.	1c.	½c.
Kieserite (lb)	Free	½c.	Free
Oxide or calcined magnesia (lb.)	3½c.	7c.	5c.
Menthol (lb.)	50c.	75c.	30c.
Camphor, synthetic (lb.)	6c.	1c.	5c.
Lithopone and other combinations or mixtures of zinc sulfide and barium sulfate:			
Containing 30% or more zinc sulfide (lb.)	1½c.	1½c.+20%	1½c.
Potassium compounds:			
Citrate (lb.	25%	18c.	13c.
Chlorate (lb.)	2½c.	2½c.	1½c.
Perchlorate (lb.)	1½c.	2½c.	1½c.
Permanganate (lb.)	4c.	6c.	6c.
Nitrate or saltpeter, refined	1½c. lb.	5½c. lb.	1c. lb.
Santonin, and salts of (lb.)	75c.	Free	Free
Sodium	Free	25%	25%
Potassium	Free	25%	25%
Lithium, beryllium, and caesium	Free	Free	25%
Sodium compounds:			
Bicarbonate (lb.)	½c.	½c.	Free
Borate or borax, refined (lb.)	½c.	½c.	Free
Chlorate (lb.)	1½c.	1½c.	2c.
Silicate (lb.)	½c.	½c.	½c.
Citrate (lb.)	25%	15c.	12c.
Formate (lb.)	2c.	2½c.	2c.
Oxalate (lb.)	25%	3½c.	25%
Phosphate (except pyro) n. s. p. f. (lb.)	½c.	1c.	½c.
Phosfate (except pyro) containing less than 45% water (lb.)	½c.	2c.	1½c.
Silicofluoride (lb.)	25%	1½c.	1½c.
Sulfate anhydrous (ton)	$2	$4	$2
Sulfite, containing not more than 35% sodium sulfide (lb.)	½c.	½c.	½c.
Sulfite, containing more than 35% sodium sulfide (lb.)	½c.	½c.	1c
Sulfite (lb.)	½c.	½c.	½c.
Bisulfite and metabisulfite (lb.)	½c.	½c.	½c.

Salesmen's Association, American Chemical Industry, holds first 1930 meeting at the Drug & Chemical Club, New York, March 24. Fred A. Kopff, assistant district attorney, Kings County, New York, spoke on crime and its detection, using two actual cases, illustrated with lantern slides of the actual scenes, to show how the law works in this regard.

YOU WOULDN'T FOOL ME, MISTER!?

Sykes in the N. Y. Evening Post

MONMOUTH CHEMICAL CORP.

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APRIL 15th
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to
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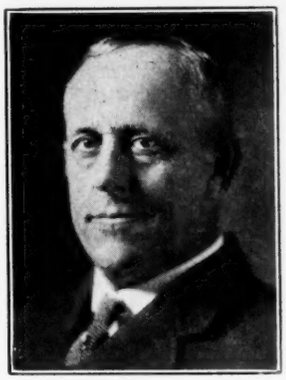
Wood Chemical Institute Elects Officers For Coming Year

Wood Chemical Institute holds annual meeting in Buffalo, N. Y., March 13. Officers and directors were elected as follows: president, M. C. Burt, Gray Chemical Co., Roulette, Pa.; vice-president, C. A. Saunders, Cadillac Soo Lumber Co., Cadillac, Mich.; secretary treasurer, J. A. McCormack, Union Charcoal & Chemical Co., Olean, N. Y.; directors, A. R. Brunker, Miner-Edgar Chemical Corp.; R. A. Cartwright, Clawson Chemical Co.; W. J. Cummins, Tennessee Products Co.; W. L. Teim, Kinzua Valley Chemical Co.; W. H. Matthews, Forest Products Chemical Co.; W. J. Merwin, Thomas Keery Co.; Paul Quinn, Vandalia Chemical Co.; John Troy, Heinemann Chemical Co.; and G. W. Truxall, Cleveland-Cliffs Iron Co.



M. C. Burt, President, Wood Chemical Institute

The institute, which was organized in May, 1929, has made a steady growth and is reported now to represent the bulk of the cordage in the Eastern, Western, and Southern groups of the wood chemical industry. Seventy-five per cent of the present operaing capacity of the plants engaged in the destructive distillation of wood in the United States are members of the institute.

Butyl Acetate Dumping Order Issued

Butyl acetate anti-dumping order is issued by the Secretary of the Treasury, March 3, against butyl acetate from Germany, following an investigation which showed that the sales price of the imported article in the United States is lower than the market value in Germany.

Collectors of customs have been instructed to assess each importation of butyl acetate from Germany with an additional duty equal to the difference between the foreign value and the selling price here. The amount of this duty must be determined independently for each shipment entered, and the order will be effective as long as the American selling price of German butyl acetate remains lower than its market value in the country of production.

An investigation of butyl acetate imports with the view of issuing an anti-dumping order has been in progress by the Bureau of Customs for two years. Foreign agents in Germany ascertained data on cost of production and market value in that country and these were compared with prices received for sales on imported butyl acetate made in this country. The order, which applies only to German imports, is based on the finding that the industry in the United States is being injured by the sale of German butyl acetate at less than its fair value.

Standard Oil Co. of New Jersey and the I. G. Farbenindustrie jointly organize a new company to take over from the Standard I. G. Co., the rights to the hydrogenation processes for cracking crude oil. The hydrogenation processes will be offered for licensing to all petroleum refiners who are considered able to make commercial use of them. Licensees will be required to subscribe for stock in the new company and to pay a small royalty. The new company will, in turn, pay royalties to the Standard I. G. Co.

Sulfur production in Texas is taxed at the rate of 55 cents per ton according to a new law adopted in that state.

Sherwin-Williams Co. announces removal of its Rochester, N. Y. branch to 53 State st.

Solvents Industry Votes to Adopt Code Regulating Trade Practice

Solvents industry adopts following code at trade practice conference held in New York, March 18, under auspices of Federal Trade Commission. Twelve solvents manufacturers appeared in the conference through nineteen representatives. Charles H. March, Federal Trade Commission, presided, and Robert T. Baldwin, secretary, Solvents Institute, acted as secretary at the conference.

Rule 1. Any discrimination in the price of solvents between purchasers of the same class, not including discrimination in price on account of the differences in grade, quality or quantity of the product sold, or which makes only due allowance for the differences in cost of selling and transportation, or discrimination in price in the same or different communities made in good faith to meet competition where the effect of such discrimination may be substantially to lessen competition or tend to create a monopoly, is an unfair trade practice.

Rule 2. The secret payment or secret allowance of rebates whether in the form of special discounts, brokerage, storage, allowance for advertising or any other secret allowance in the form of money or otherwise, is an unfair trade practice.

Rule 3. The industry approves the practice of each individual member of the industry independently publishing and circulating his own prices.

Rule 4. The industry hereby records its approval of the practice of making the terms of sale a part of all published prices.

Rule 5. The sale of an inferior quality of solvents at a price appropriate for such solvents with the understanding a product of superior quality selling at a higher price will be delivered, is condemned by the industry as an objectionable trade practice; provided, that this rule shall not apply where a seller acting in good faith and due to an actual unforeseen shortage of the product sold, must in order to fill the order deliver a solvent of superior quality.

Rule 6. The false marking or branding of solvents of the industry with the effect of misleading or deceiving purchasers with respect to the quality, quantity, grade, or substance of the goods purchased, is an unfair trade practice.

Rule 7. The industry hereby condemns the practice of consigning stocks to consumers.

Reports Required on Ethyl Acetate

Ethyl acetate shipments must be reported daily to the Prohibition administration, according to an order issued March 20 by James M. Doran, Commissioner of Prohibition.

The daily reports, which must be made in quadruplicate, are to show the quantity shipped or delivered, the name and complete address of the consignee, and the manner in which shipment or delivery is made.

The purpose of requiring daily reports of shipments of ethyl acetate is said by Commissioner Doran to be to afford information to prohibition administrators, which will enable them promptly to follow up such shipments in cases where for any reason this action seems necessary.

Chemical Foundation, Inc., is awarded all rights to royalties accruing from patents seized from enemy aliens during the war and licensed to other companies, according to decision of United States Circuit Court of Appeals at Philadelphia, in case involving right of the Chemical Foundation to royalties paid the government for patents licensed to E. I. du Pont de Nemours & Co.

Rubber group, Chicago section, American Chemical Society, Carl E. Frick, chairman, meets March 21, to discuss milling and mixing.

George H. Lincks, New York, varnish gums, celebrates tenth business anniversary, March 8.

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The Financial Markets

Allied Chemical & Dye Corporation Reports Net Income of $30,198,523

Income Equivalent After Preferred Dividends to $12.60 Per Share on 2,178,109 Shares of No-Par Common—Compares with $26,962,441 or $11.11 A Share in 1928—Surplus After Dividends Amounts to $14,379,926.

Allied Chemical & Dye Corp. and subsidiaries for year ended December 31, 1929 report net income of $30,198,523 after depreciation, federal taxes, etc., equivalent after 7% preferred dividends, to $12.60 a share on 2,178,109 no par shares of common stock. This compares with $26,962,441 or $11.11 a share in 1928.

Surplus after dividends was $14,379,926 against $11,143,844 in previous year.

Annual report shows current assets of $157,776,046, compared with $140,443,569 last year and current liabilities of $9,520,724 as against $9,950,790. The 1929 ratio is more than 16½ to 1.

Total assets of the company in 1929 increased $20,996,723 over 1928. Cash and marketable securities increased $14,996,025. There wax a net increase of $5,615,912 in property account, and reserve for depreciation and obsolescence increased $6,092,507.

After the payment of dividends on the preferred and common stock there was $14,379,926 added to the surplus in 1929. Current liabilities included cash dividend payments of $3,954,649 and the remainder represents liability for accounts payable and wages accrued for current operations.

Orlando F. Weber, president, announced stock dividend policy of management to common stockholders in referring to the 5 per cent stock distribution declared last November. He said, "Consideration of the whole situation, past and indicated future, led your board to the conclusion that conditions warranted the action in November last in commencing the distribution of stock dividends. Naturally, these distributions may vary in amount and are dependent upon the future progress of the company.

"Necessity for the further expansion of the company's plants and installations for new products over the next five years, is clearly evidenced and will require a large investment. As heretofore, these improvements will be financed by the company without recourse to the stockholders."

Consolidated income account for year 1929, compares as follows:

	1929	*1928*	*1927*	*1926*
*Gross inc	$33,384,552	$29,871,001	$27,714,736	$27,299,828
Federal tax	3,196,029	2,908,560	3,127,864	3,227,008
Net income	$30,198,523	$26,962,441	$24,586,872	$24,072,820
Pfd dividends	2,749,943	2,749,943	2,749,943	2,749,943
Com dividends	13,068,654	13,068,654	13,068,654	9,801,490
Surplus	$14,379,926	$11,143,844	$8,768,275	$11,521,387
P. & L. Surplus	196,205,745	181,825,818	170,681,974,	161,913,698

*After expenses, depreciation, ordinary taxes, etc.

Consolidated balance sheet of Allied Chemical & Dye Corp. and subsidiaries as of December 31, 1929, compare as follows:

	1929	*1928*	*1927*	*1926*
Assets				
R E, plts, mach, eq, etc	$202,315,812	$196,699,901	$173,496,222	$165,130,008
Invests	5,469,076	7,377,332	8,115,382	6,291,379
Cash	20,303,291	15,097,408	15,733,042	13,585,344
Gov & mark securities	92,500,723	82,710,581	86,337,748	80,834,677
Accts & notes rec	16,225,955	16,864,353	16,218,822	17,880,568
Inventories	28,746,078	25,771,227	27,432,295	31,727,914
Deferred charges	746,643	790,052	915,122	920,003
Pats, goodwill, etc	21,305,942	21,305,942	21,305,943	21,305,942
Total	$387,613,520	$366,616,796	$349,554,576	$337,675,835
Liabilities				
Preferred stock	$39,284,900	$39,294,900	$39,284,900	$39,284,900
*Com stock	10,890,545	10,890,545	10,890,545	10,890,545
Dividends payable	3,954,649	3,954,649	3,954,649	3,954,649
Accounts payable	5,148,793	5,594,421	4,908,306	5,540,120
Accrued wages	417,282	401,720	391,689	431,318
Dp res, etc	110,466,603	104,374,095	99,176,973	93,605,708
Gen cone res	12,877,610	12,340,439	12,293,962	13,126,378
Tax reserve	3,753,478	3,341,681	3,387,421	3,630,632
Ins reserve	2,310,951	2,224,894	2,204,170	2,183,307
Other reserves	2,302,964	2,383,634	2,379,987	3,114,580
Surplus	196,205,745	181,825,818	170,681,974	161,913,698
Total	$387,613,520	$366,616,769	$349,554,576	$337,675,835

*Represented by 2,178,109 no par shares carried at $5 per share.

Union Carbide & Chemical Corp. Reports Net of $35,427,024 For 1929

Union Carbide & Carbon Corp. reports for the year 1929 net income of $35,427,024, after provision for income and other taxes, depreciation, depletion and other charges, interest on bonds, mortgages and debentures of subsidiary companies, and dividends on preferred stocks of subsidiaries. This compares with net income of $30,577,382 during 1928, and with $25,340,660 reported for the year 1927.

Net income last year was equivalent to $4.19 per share on the 8,453,723 shares of capital stock, the average number based on the new stock outstanding during the year, and to $3.94 per share on the 8,981,581 shares outstanding at the end of the year. Net income for the year realized included a realized profit of $1,870,884 in the security account.

President Jesse J. Ricks reports that sales of many products of the company were retarded as a result of the recession in general business which occurred in the latter part of the year. In consequence the profits, although greater than for 1928, failed to meet the estimates made earlier in the year.

Consolidated income account for year 1929 compares as follows:

	1929	*1928*	*1927*	*1926*
Net after federal taxes	$44,126,066	$39,527,253	$34,195,682	$32,834,977
Depreciation, depl., etc.	7,461,240	7,694,857	7,655,190	7,470,977
Balance	$36,664,826	$31,832,396	$26,540,492	$25,364,000
Interest	674,802	692,014	706,832	722,041
Subsidiaries pfd divs	563,000	563,000	493,000	499,353
Net inc	$35,427,024	$30,577,382	$25,340,660	$24,142,606
Dividends	20,736,657	16,235,208	15,958,398	13,963,598
Surplus	$14,690,367	$14,342,174	$9,382,262	$10,179,008
P & L surplus	96,781,281	86,606,035	72,557,917	63,035,491

Consolidated balance sheet of Union Carbide & Carbon Corp. and subsidiaries as of December 31, 1929, compares as follows:

Assets				
Land, bldgs, mac, eq, etc	$210,594,249	$198,198,901	$180,957,975	$168,675,359
Pat, goodwill, etc	1	1	1	1
Marketable securities & call loans	52,826,260	....	....	....
Investments	12,548,152	11,522,046	3,967,601	5,467,473
Cash	15,485,637	17,502,924	16,267,382	12,829,786
Notes and accounts rec.	21,771,187	20,234,881	17,754,957	19,744,487
Inventories	38,499,350	32,321,962	29,157,531	30,351,280
Deferred charges	1,902,260	1,729,638	1,457,308	1,330,981
Total	$353,627,096	$281,510,353	$249,562,760	$238,399,367
Liabilities				
Cap stock	*$174,180,078	$116,621,425	$109,112,421	$109,112,421
Preferred stock sub.	7,350,000	7,350,000	6,350,000	6,350,000
Funded debt subs	12,758,700	13,112,000	13,379,500	13,635,650
Notes and accounts pay	5,006,657	4,672,332	3,690,804	4,827,806
Accrued interest	204,247	205,432	209,114	208,242
Dividends pay	5,838,027	4,113,108	3,989,600	3,989,600
Accrued tax	4,085,960	4,103,598	3,454,001	3,815,689
Accr. pfd dividends	74,666	74,666	74,666	74,666
Other accrued liab	338,162	288,749	251,708	451,620
Dep res, etc	47,009,309	44,363,008	36,493,029	32,898,182
Surplus	96,781,281	86,606,035	72,557,917	63,035,491
Total	$353,627,096	$281,510,353	$249,562,760	$238,399,367

*Represented by 8,981,581 no-par shares.

Quaker City Chemical Co. publishes pocket-size booklet of information of interest to textile manufacturers. Copies may be secured upon request to the company's Philadelphia or Knoxville, Tenn., offices.

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Westvaco Chlorine Net Profit Reaches $1,127,054 Total For Year

Westvaco Chlorine Products Corp., and subsidiaries report for year ended December 31, 1929, compares as follows:

	Dec. 31, '29	*Dec. 29, '28*
Sales	$5,943,958	$5,215,865
Cost and expenses	4,173,678	3,699,686
Operating profit	$1,770,280	$1,516,179
Other income	117,300	72,481
Total income	$1,887,580	$1,588,660
Interest, discount, etc.	222,543	231,591
Depreciation	412,734	395,999
Federal taxes	125,249	115,352
Net profit	$1,127,054	$845,718

Consolidated balance sheet of Westvaco Chlorine Products Corp. and subsidiaries as of December 31, 1929, compares as follows:

Assets

	Dec. 31, '29	*Dec. 29, '28*
*Plant and equipment	$5,586,478	$3,995,738
Cash	222,154	107,429
Call loans	....	200,000
Accounts receivable	269,650	388,679
Inventories	938,650	692,957
Marketable investments	95,042	111,720
Perm investments	2,000	2,000
Bond sinking fund cash	123,726	92,561
Contr and processes	473,249	529,725
Deferred charges	181,928	364,812
Total	$7,892,868	$6,485,626

Liabilities

7% preferred stock	$2,194,600	$2,194,600
Common stock	†2,100,267	656,399
Funded debt	2,206,500	2,388,000
Accounts pay	30,736	153,647
Dividends pay	38,406	38,406
Trust agreement notes pay	....	22,000
Federal tax reserve	125,247	115,353
Deferred credits	29,421	16,916
Earned surplus	1,167,691	900,305
Total	$7,892,868	$6,485,626

*After depreciation. †Represented by 225,155 no-par shares. ‡Includes notes payable.

American Commercial Net Higher

American Commercial Alcohol Corp. and subsidiaries consolidated income account for year ended December 31, 1929, compares as follows:

	Year ended Dec. 31, '29	*8 mos end Dec. 31, '28*
Oper and other income	$2,782,780	$1,635,830
Expenses, etc	1,070,636	513,102
Oper profit	$1,712,144	$1,122,728
Depreciation	186,697	100,688
Interest, disc, etc	....	209,446
Federal taxes	129,731	101,733
Net profit	$1,395,716	$710,861
Pfd divs	143,708	*118,067
Common dividends	714,150	....
Surplus	$537,858	$592,794

*Includes dividend payable February 1, 1929.

Vanadium Corp. of America and subsidiary for year ended December 31, 1929, report net income of $1,849,886, after federal taxes, depreciation, depletion, etc., equivalent to $4.89 a share on 378,367 no-par shares of capital stock. This compares with $1,706,024, or $4.53 a share on 376,637 shares, in 1928.

Consolidated income account for year 1929 compares as follows:

	1929	*1928*	*1927*	*1926*
*Net earn	$2,328,830	$1,976,165	$2,221,374	$2,509,964
Other inc	344,561	216,794	243,884	163,053
Total inc	$2,673,391	$2,192,959	$2,465,258	$2,673,017
Dep & depl	608,448	251,305	358,211	326,461
Fed tax	207,630	228,704	228,530	247,655
Other chgs	7,427	6,926	29,277	118,870
Net inc	$1,849,886	$1,706,024	$1,849,240	$1,980,031
Dividends	1,468,648	1,506,548	1,506,548	1,413,014
Surplus	$381,238	99,476	$342,692	$567,017

*After expenses, ordinary repairs and maintenance.

Robertson Chemical Corp. is organized in Richmond, with authorized capital of $500,000, by a merger of Robertson Fertilizer Co. with Union Fertilizer Co.

Monsanto Chemical Works Reports Net of $1,691,338 During 1929

Monsanto Chemical Works, including subsidiaries acquired during the year, reports consolidated net profit of $1,691,338 after depreciation, interest and federal taxes, equivalent to $4.25 a share on 398,286 shares of no-par stock outstanding at end of year.

Net profit of parent company for 1929 was $1,087,571 after charges and taxes, equal to $2.73 a share on 398,286 shares of stock, comparing with $944,438 or $7.51 a share on 125,604 shares in 1928.

Acquisitions during the year were the Rubber Service Laboratories and its subsidiary, Elko Chemical Co., the fine chemical business of the Mathieson Alkali Works and the Merrimac Chemical Co., Boston. The British subsidiary, Graesser-Monsanto Chemical Works, Ltd., purchased the Wear Tar Works of Brotherton & Co., and the methyl salicylate business of K. B. Mavlankar and the British Saccharin Manufacturing Co.

Consolidated income account compares as follows:

	1929	*1928*	*1927*
Gross profit	$3,140,911	$1,645,408	$1,419,100
Depreciation	815,537	371,681	334,375
Net income	$2,325,374	$1,273,727	$1,084,725
Other income	171,813	108,015	25,593
Total income	$2,497,187	$1,381,742	$1,110,318
Interest and miscellaneous charges	151,197	305,544	354,696
Res. and devel	424,847	....	....
Federal taxes	229,805	131,760	83,000
Balance	$1,691,338	$944,438	$672,622
Dividends	950,693	275,000	185,027
Surplus for year	$740,645	$699,439	$487,595

Consolidated balance sheet of Monsanto Chemical Works for years ended December 31, compares as follows:

Assets

	1929	*1928*
Plant and equipment	$17,128,610	$ 8,299,257
Pat., goodwill, etc	2	2
Investments	73,265	58,106
Market securities	1,023,381	....
Inventories	3,873,060	1,747,084
Cash and Call Loans	615,532	1,205,194
Bills and accounts receivable	1,320,119	695,612
Deferred charges	136,370	153,936
Prepaid insurance, etc	162,825	31,631
Total	$24,333,164	$12,190,822

Liabilities

	1929	*1928*
Capital stock	$6,638,105	$ 4,186,800
Bonded debt	1,748,500	1,754,500
Purchase Money Notes	419,051	419,051
Dividends payable	124,320	68,750
Accounts payable	963,817	451,958
Accrued liabilities		
Tax reserve	291,205	170,248
Depreciation and reserve	7,137,781	1,829,051
Container and reserve	721,991	82,190
Res. for insurance and conting	426,739	69,416
Surplus	12,319,760	3,158,858
Total	$24,333,164	$12,190,822

Industrial Rayon Corp. report for year ended December 31, 1929, shows net profit of $1,451,729 after depreciation, interest and federal taxes, equivalent to $7.63 a share earned on 190,068 shares of stock. This compares with $1,653,601 or $9.25 a share on 178,623 shares in 1928.

Income account for year 1929 compares as follows:

	1929	*1928*	*1927*
Operating profit	$2,044,643	$2,254,962	$1,413,075
Depreciation	354,946	342,673	299,690
Interest	47,468	55,688	73,617
Federal taxes	190,500	203,000	132,000
Net profit	$1,451,729	$1,653,601	907,768

Columbian Carbon Co. and subsidiaries report for year ended December 31, 1929 shows net profit of $4,015,316 after depreciation, depletion, federal taxes, etc., equivalent after subsidiary dividends and proportion of profit applicable to minority interest, to $7.83 a share on 467,929 no par shares of stock outstanding at end of year. This compares with $2,991,362 or $6.39 a share on 442,344 shares outstanding at end of previous year.

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Benzol

Whiting

Magnesium Carbonate

Magnesium Oxide

Quinine Bisulphate

Financial Diary

Mar. 1—Monsanto declares dividends of 31¼ cents and 1½% in stock, payable April 1 to holders of record March 15.

Mar. 3—Dow Chemical offers $3,500,000 10-year 6% sinking fund notes at par.

Mar. 4—American Cyanamid declares 40 cent dividend on class "A" and class "B" common, payable April 1 to stock of record March 15.

Mar. 5—Mathieson Alkali declares regular quarterly dividends of 1¾% upon the preferred and 50 cents on the common, payable April 1 to stock of record March 15.

Mar. 6—Flintkote Co. declares dividends of 37½ cents on class "A" and class "B" stock, payable April 15 to holders of record April 10. American Stockholders ratify proposed merger with Tubize.

Mar. 7—Liquid Carbonic Corp. lists 31,334 additional shares no-par common on the New York Stock Exchange-Celanese Corp. declares quarterly dividends of $1.75 on the prior preferred stock and 75 cents on the participating preferred, payable April 1 to stock of record March 18. Schacht, president of Reichsbank resigns, shares on Berlin Exchange fall off.

Mar. 10—Du Pont meeting.

Mar. 12—U. S. Industrial Alcohol and American Commercial Alcohol decline to new lows of 104 and 24 respectively. Air Reduction declares regular quarterly dividend of 75 cents payable April 15 to holders of record March 31. Air Reduction meeting.

Mar. 13—Tubize stockholders ratify plan for merger with American Chatillon.

Mar. 14 Westvaco Chlorine Products declares regular dividend of $1.75 on the preferred stock of record March 15, payable April 1.

Mar. 17—International Salt meeting. American Commercial Alcohol declares quarterly dividend of 40 cents payable April 15 to holders of record March 29.

Mar. 18—Company meetings of Atlas Powder, Hercules Powder, International Nickel, and Solid Carbonic, Ltd. Abbott Laboratories regular quarterly dividend payable April 1 to holders of record March 21. Canadian Industries, Ltd. declares regular dividends of $1.75 on the preferred stock of record March 31, payable April 15, and regular dividend of 62½ cents plus extra dividend of 25 cents on the common stock, payable April 30 to holders of record March 31.

Mar. 19—Commercial Solvents, Vanadium Corp. directors' meetings. Call money 2%, lowest since January 8, 1925.

Mar. 20—Texas Gulf Sulphur meeting. U. S. Industrial Alcohol Co. plans to increase stock from 400,000 to 500,000 shares. Freeport Texas Co. announces regular quarterly dividend of $1.00 payable May 1 to holders of record April 15.

Mar. 24—Du Pont announces plans to purchase Roessler & Hasslacher, to be voted upon by stockholders of latter company at meeting in April.

Mar. 25—Allied Chemical & Dye Corp. declares regular quarterly dividend of $1.50 on common stock of record April 8, payable May 1. Atlas Powder Co. declares quarterly dividend of 1½% on preferred stock of record April 8, payable May 1. Meetings of Mathieson, Monsanto, United Chemicals.

Mar. 26—American Solvents & Chemical, Westvaco Chlorine Products, Air Reduction meetings.

Mar. 27—U. S. Industrial Alcohol declares regular quarterly dividend of $1.50, payable May 1 to stock of record April 15.

U. S. Industrial Alcohol Net in 1929 Equivalent to $12.63 Per Share

U. S. Industrial Alcohol Co. issues pamphlet report for year ended December 31, 1929. Net profit after depreciation and federal taxes, of $4,720,858 is the same as previously published, and is equivalent to $12.63 a share on 373,846 shares of no-par stock outstanding at end of year. This compares with $3,777,801 or $10.29 a share on 320,000 shares of common stock outstanding at end of 1928, after preferred dividend requirements.

Consolidated income account for year 1929 compares as follows:

	1929	*1928*	*1927*	*1926*
Oper inc	$8,942,594	$7,196,712	$5,105,311	....
Expenses	2,392,746	1,910,763	1,855,491	....
Depreciation	1,245,424	1,038,042	654,432	....
Oper prof	$5,304,424	$4,247,907	$2,595,388	$1,451,926
Preferred sales sec	....	....	....	1,133,474
Total income	$5,304,424	$4,247,907	$2,595,388	$2,585,400
Interest	....	....	....	27,492
Federal taxes	583,566	470,106	350,862	319,679
Net profits	$4,720,858	$3,777,801	$2,244,526	$2,238,229
Cuba dis dividends	....	74,635	82,537	128,562
Preferred dividends	....	407,982	420,000	420,000
Com dividends	2,454,768	1,380,000	1,200,000	....
Surplus	$2,266,090	$1,915,184	$541,989	$1,689,667
P & L surplus	15,238,355	14,214,215	16,373,306	18,263,379

Surplus account follows: Surplus on December 31, 1928, $14,214,215; add: Surplus for year 1929, after dividends, $2,266,090; total surplus, $16,480,305; deduct: Additional allowance for depreciation, etc., charged to surplus in connection with federal income tax settlement (net), $1,241,950; leaving surplus on December 31, 1929, $15,238,355.

New York Stock Exchange has received notice from U. S. Industrial Alcohol of proposed decrease in authorized preferred stock by $6,000,000 and increase in common stock, to 500,000 shares from 400,000 shares.

U. S. Alcohol retired all of its preferred some time ago, but under laws of West Virginia, where the company is incorporated, it is necessary to eliminate this from the company's authorized capitalization. At the same time the management decided to increase the authorized common since there are at present only about 24,000 shares unissued in the treasury.

Merck & Co. Profits Higher For 1929

Merck & Co., Inc. for year ended December 31, 1929, reports net addition to surplus after depreciation, taxes, interest, amortization, federal taxes, and other charges, but before dividends, of $653,339, of which $428,080 was applicable to stock owned by Merck Corporation, equal to $12.61 a share on 33,950 shares of 8% preferred stock of latter company, comparing with $223,508 or $6.57 a preferred share in 1928.

During 1929 Merck & Co., Inc. redeemed $600,000 more of its bonds, reducing the outstanding amount to $1,200,000. A dividend of $2 per share has been declared payable April 1 to stock of record March 17, as compared with the $1 quarterly basis which has been maintained for five years.

Westvaco Chlorine Products, Inc., and United Chemical Industries of U. S. S. R. sign contract providing for technical assistance in production of liquid chlorine in the Soviet Union and the manufacture of Vorce chlorine cells for salt brine electrolysis. Contract provides for the use of the patents of the American company by the Soviet chemical industry and for the sending of American engineers to the Soviet Union. In addition, Soviet engineers will study production methods at the Westvaco plants. The first chlorine plant of the several to be constructed in the U. S. S. R. is to be completed in about six months.

Will & Baumer Candle Co., Syracuse, announces election of James J. Phelan, Jr., Boston, to board of directors.

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The Cleveland-Cliffs Iron Co.

HOME OFFICE 14TH FLOOR UNION TRUST BUILDING
CLEVELAND, OHIO.

Freeport Texas Quarter Net Equivalent to $1.38 Per Share

Freeport Texas Co. reports for quarter ended February 28, 1930, net income of $1,007,784 after taxes, equivalent to $1.38 a share on 729,844 shares of no-par stock. This compares with $737,037 or $1.01 a share in first quarter of 1929.

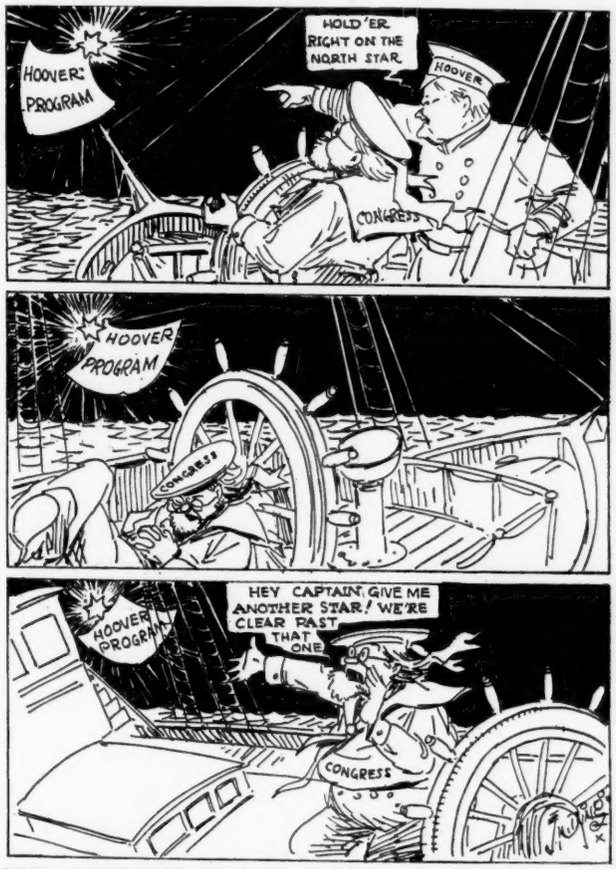
Consolidated income account for quarter ended February 28, 1930, compares as follows:

	1930	*1929*	*1928*	*1927*
Gross sales....	$3,597,493	$3,109,982	$2,413,677	$2,785,801
Costs & exp...	2,493,301	2,260,128	1,972,985	2,022,505
Gross inc....	$1,104,192	$849,854	$440,692	$763,296
Other inc.....	57,190	40,490	33,799	34,045
Total inc...	$1,161,382	$890,344	$474,491	$797,341
Depr res.....	34,747	48,639	41,331	50,906
Tax res.....	118,851	104,668	28,000	27,583
Net inc.....	$1,007,784	$737,037	$405,160	$718,852
Earned per sh.	$1.38	$1.04	$0.56	$0.99

Alabama Chemical Co. is refused a review March 3 by United States Supreme Court of its suit against the International Agricultural Corp., involving judgment of $47,000 for breach of contract on Florida phosphate rock.

Downington Iron Works, Downington, Pa., issues booklet entitled, "Corrosion Resistant Alloys in General Fabrication." Copies may be obtained upon request.

Newport Chemical Works offers new direct fast orange azo dye, Newport Direct Fast Orange W. S.



WE MIGHT HAVE GONE FARTHER IF THE MATE HAD STAYED AWAKE

Ding in the N. Y. Herald-Tribune

Canadian Industries, Ltd., Reports Higher Net Income During 1929

Canadian Industries, Ltd., jointly controlled by Imperial Chemical Industries, Ltd., of Great Britain, and E. I. du Pont de Nemours Co., of the United States, for fiscal year ended December 31, 1929, reports net operating income of $3,583,731, against $2,713,415 in 1928. Income from investments was $1,205,559, against $1,333,433 and amount realized from sale of assets $1,235,774, against $10,415,152 bringing total income to $6,025,064, against $14,462,000 in 1928. In 1928 company sold part of its holdings of General Motors stock.

From 1929 total income, $325,500 was deducted for preferred dividends and $3,661,157 for dividends on common, leaving surplus of $2,038,407 for year.

Balance sheet shows current assets at $20,008,659, against current liabilities of $2,796,242, giving working capital of $17,212,417, compared with $18,030,086 at close of 1928. Property account was valued at $22,100,308, against $11,838,382 at end of 1928. Investments were $3,887,675, against $8,493,780. Total assets reached $45,996,643, against $40,867,306.

Among liabilities, reserves were carried at $7,891,474, against $5,517,689. From surplus account $6,656,550 was deducted to be transferred to capital stock, making total surplus $12,342,789, against $16,961,022. Preferred stock valuation was unchanged at $4,650,000 but common stock was carried at $18,260,046, against $11,233,537.

Anglo-Chilean Consolidated Nitrate Corp. is negotiating with the Chilean government for the creation of a modern port and harbor at Tocopila, the shipping point for the company's nitrate of soda output. The plan involves construction of breakwater, piers, etc. At present all ocean traffic at Tocopila is handled by lighter, the ships standing off the town in the roadstead.

Waukegan Chemical Co., North Chicago, lacquer finishing materials, changes name to Brevolite Lacquer Co. Officers of company are president and treasurer, Casper Apeland; vice-president, Emory H. Wilder; secretary, L. L. Klewer; assistant treasurer, F. H. Apeland; director of research, Edmond H. Bucy.

Neville Chemical Co., Pittsburgh, publishes three illustrated booklets describing its products. The company has entered the coal tar solvent industry and the booklets deal with solvents, resins for general industrial use, and resins for varnishes, respectively.

American Association of Textile Chemists and Colorists announces appointment of committee under chairmanship of P. J. Wood, vice-president, Oriental Silk Co., Paterson, N. J., to work towards formation of central research bureau in the textile industry.

American Telephone & Telegraph Co. announces a long line construction program for 1930 involving an expenditure of $106,000,000. This construction is part of a nationwide Bell system program which contemplates expenditure this year totalling more than $700,000,000.

Atlas Powder Co. re-elects following directors: C. F. Backus, Ernest du Pont, Isaac Fogg, Leland Lyon, John W. Mathews, E. W. Maynard, E. W. Moorhouse, W. T. Penniman, Leonard Richards, Jr., J. F. Van Lear and Charles Warner.

General Dyestuff Corp. announces new dyes as follows: Supramine Yellow RA, Red Violet RRNA, Faustusol Blue GA, and Acid Authracene Brown PGA.

Chemists' Club, New York, holds memorial meeting, March 16, to honor the memory of the late Dr. William H. Nichols.

Monahan Chemical Co., New York, announces removal to 100 William st., that city.

The Industry's Stocks

1930 March High	1930 March Low	1930 March Last	1930 High	1930 Low	1929 High	1929 Low	Sales In March	Sales During 1930	ISSUES	Par $	Shares Listed	An. Rate	Earnings $-per share-$	1929	1927
									NEW YORK STOCK EXCHANGE						
148	131	143¼	148	118	223¾	77	169,400	444,800	Air Reduction	No	770,000	$3.00		5.63	4.61
324½	265½	303½	304½	255¾	354¼	197	35,100	75,300	Allied Chem. & Dye	No	2,286,000	6.00		12.60	11.12
125	123	125	125	121	125	118½	1,500	5,000	7% cum. pfd.	100	393,000	7.00		76.84	68.63
10	7¼	10	8¼	6¾	23¾	4	14,600	27,100	Amer. Agric. Chem.	100	333,000			Nil	1.59
37	29½	37	35¼	26	73¾	18	9,200	25,700	6% cum. pfd.	100	285,000			2.47	7.86
29¾	19½	23¾	33	19¼	55	20	85,500	218,700	Amer. Com. Alc.	No	382,000	1.60		4.78	3.39
49	44	48¾	51¼	44	81¾	31½	22,700	89,800	Amer. Metal Co., Ltd.	No	868,000	3.00	9 mo.	2.60	3.58
115¾	114¼	115¾	116	110	135	106	800	1,400	conv. 6% cum. pfd.	100	69,000	6.00	9 mo.	37.30	26.52
77¼	70¼	76	78¼	69¾	130½	162	124,800	343,200	Amer. Smelt. & Refin.	No	1,830,000	4.00	6 mo.	5.03	8.24
140	134	140	140	133½	16¼	15¾	3,200	8,500	7% cum. pfd.	100	500,000	7.00	6 mo.	21.90	37.17
22½	15	18¾	22¼	15	92¾	25¾	101,300	106,700	Amer. Solvents & Chem.	No	181,000			2.56	1.69
33½	25¼	28¾	33½	25¾	138	123½	21,500	25,800	conv. $3 cum. pfd.	No	113,000	3.00		8.01	6.71
14¼	12¾	13	17¼	8¾	49¼	7	18,900	195,200	Amer. Zinc. Lead, & Smelt.	25	200,000		11 mo.	0.76	Nil
72	66	72	79¾	56	111½	49¾	1,300	14,100	6% cum. pfd.	25	97,000	6.00	11 mo.	7.41	5.99
79	69¾	78¾	80¾	69½	140	70	927,000	2,651,900	Anaconda Copper Mining	50	8,828,000	7.00	1928	6.63	3.37
25½	22¾	24½	27¾	22½	49½	18½	11,600	37,100	Archer Dan. Midland	No	550,000	2.00	3 mo.	0.71	4.02
104	103¼	104	104	103½	115	102½	50	110	7% cum. pfd.	100	41,000	7.00	3 mo.	12.06	38.25
49¼	38¾	48¾	49¼	36¼	77¼	30	445,400	685,600	Atlantic Refining Co.	25	2,678,000	1.00		6.10	5.58
106	87½	103¾	106	81½	140	67	49,200	72,200	Atlas Powder Co.	No	260,000	4.00		7.66	4.39
104½	102	104¼	104¼	101	106½	90	340	1,540	6% cum. pfd.	100	90,000	6.00		28.25	18.76
5	3½	3¾	5¼	3¾	12¾	4¼	12,600	30,900	Butte & Sup. Mining	10	290,000	2.00		Nil	0.28
4¼	3½	3¾	4¼	3	9½	2	5,700	52,400	Butte Copper & Zinc	5	600,000			0.34	0.31
14¾	12	12½	15¼	11	32	10¾	19,400	61,900	Certain-Teed Products	No	400,000		9 mo.	Nil	Nil
45¼	38	39	45¼	38	81¼	45½	700	700	7% cum. pfd.	100	63,000		9 mo.	11.38	6.77
...	...	...	65	65	127⅞	53	...	100	Chile Copper	25	4,415,000	3.50	9 mo.	4.54	4.52
199	175	176¾	199	168½	344	105	170,700	406,000	Columbian Carbon	No	457,000	4.00	9 mo.	6.31	6.39
36⅛	31½	37	36⅜	27¼	63	20½	1,034,600	2,294,700	Comm. Solvents	No	2,435,000	1.00		1.51	1.32
102⅜	92¼	100¼	102⅜	87½	126⅜	70	144,100	295,600	Corn Products	25	2,530,000	3.00		5.75	4.35
147	142	145	147	140	144½	137	760	2,960	7% cum. pfd.	100	250,000	7.00	9 mo.	43.48	50.98
43½	37	43	43½	28⅜	69½	21½	67,300	188,000	Davison Chem. Co.	No	504,000	1.00		3.34	1.58
42⅜	39	39	42½	30½	64¼	24	6,300	23,200	Devoe & Raynolds "A"	No	160,000	2.40		4.52	5.95
111½	111½	111½	111½	106½	115½	102	30	430	7% cum. 1st pfd.	100	16,000	7.00		67.59	64.02
143½	125	140	143½	112½	231	80	361,600	672,800	Dupont de Nemours	20	10,339,000	4.00		6.99	5.97
120	116⅞	120	120	114½	119½	107½	4,700	13,400	6% cum. deb.	100	978,000	6.00		78.54	69.06
244¼	215½	236¼	244¼	175½	264¾	150	193,200	273,900	Eastman Kodak	No	2,263,000	5.00	1928	9.60	9.61
127	122½	127	127	120¼	128	117	600	700	6% cum. pfd.	100	62,000	6.00	1928	326.17	326.68
49¼	41¼	47	49¾	38¼	54¼	23¾	143,500	337,400	Freeport Texas Co.	No	730,000	4.00		5.60	4.49
70¾	54¼	67½	70¾	49¼	94¾	42½	244,600	338,600	General Asphalt Co.	No	411,000	4.00	6 mo.	1.41	2.79
38	33½	35¼	38	31	64¼	26	110,600	201,000	Glidden Co.	No	688,000	2.00		3.57	3.55
105½	102½	104	105¼	98½	106¼	95	1,300	2,200	7% cum. prior pref.	100	74,000	7.00		39.51	32.69
82¼	80	83	85	78¼	130	80	600	2,900	Hercules Powder Co.	No	568,000	3.00		5.95	22.04
118½	118¼	118½	118½	117	121	112¼	100	500	7% cum. pfd.	100	114,000	7.00		38.16	35.35
117	95	117	124	90	135	68¼	7,600	31,700	Industrial Rayon	No	191,000		11 mo.	7.81	8.68
7¼	5¼	7¼	7¼	4½	17¼	4	19,100	54,000	Intern. Agric.	No	444,000			0.79	1.66
61	54½	61	58	54½	88¾	40	4,800	6,200	7% cum. prior pfd.	100	100,000	7.00		10.54	14.47
43	38	43	43	31¾	72¾	25	1,332,700	2,969,000	Intern. Nickel	No	13,781,000	1.00		1.47	1.05
85¼	73	85¼	85½	69	80½	61½	4,530	9,230	Intern. Salt	100	61,000	6.00		11.32	7.23
145¼	125	126¾	148⅜	117	242¾	90	272,800	547,500	Johns-Manville Corp.	No	750,000	3.00		8.09	6.75
22	21	22	23	20¼	42	20	1,500	10,400	Kellogg (Spencer)	No	598,000	1.60		2.36	3.42
81¼	65	79	81¼	52¾	113¼	40	104,600	231,100	Liquid Carbonic Corp.	No	311,000	4.00		6.12	6.76
31½	25	29	35½	25¼	59	21¼	13,500	37,200	McKesson & Robbins	No	1,117,000	2.00	6 mo.	1.50	3.77
47	41¼	47	47¼	41¼	63	40	5,100	12,000	conv. 7% cum. pref.	50	426,000	3.50	6 mo.	5.13	11.51
36	28¼	35	31½	28	46	30½	1,100	5,700	MacAndrews & Forbes	No	384,000	2.60	9 mo.	2.21	3.30
100	96	100	100	93	107½	104	60	590	6% cum. pfd.	100	28,000	6.00	9 mo.	44.84	65.48
51¾	43½	50	51¾	37½	72¾	29	142,200	288,400	Mathieson Alkali	No	637,000	2.00		3.31	2.95
122½	120½	122½	122½	115	125	120	30	250	7% cum. pfd.	100	28,000	7.00		93.91	84.50
56	48⅛	53½	60	48⅛	80½	47	9,600	33,600	Monsanto Chem.	No	404,000	1.25	9 mo.	3.45	3.04
38¼	34¼	34¼	39½	29	58	15	20,500	90,900	National Dist. Prod.	No	275,000	2.00		1.32	Nil
184½	171½	170¼	189½	137	210	129¼	8,800	40,400	National Lead	100	310,000	5.00	1928	11.45	8.40
142	139	141	142	138½	141½	138	920	2,120	7% cum. "A" pfd.	100	244,000	7.00	1928	24.10	20.23
118	116	118	118	116	123¾	115	450	1,250	6% cum. "B" pfd.	100	103,000	6.00	1928	40.34	31.20
85	61	78	85	51	103	143	2,800	5,900	Newport $3 cum. conv. "A"	50	130,000	3.00	9 mo.	9.03	5.55
44¼	36¼	42¼	44¼	26¼	60¾	22	64,200	142,500	Penick & Ford	No	434,000			3.97	2.56
...	...	...	110	107	110	100	...	120	7% cum. pfd.	100	33,000	7.00		73.33	53.42
69¼	64¼	67¼	70½	52¾	98	43½	19,700	67,200	Proctor & Gamble	No	6,410,000	2.00	6 mo.	1.82	2.96
25½	21¾	25¾	25½	21¼	30¾	20	186,700	278,100	Pure Oil Co.	25	3,038,000	1.50		3.06	0.97
113¾	112¼	113¾	113¾	112¼	116	108	740	1,540	8% cum. pfd.	100	130,000	8.00		40.09	16.82
53½	50¼	53¼	54¼	49¼	64	43¼	92,800	240,000	Royal Dutch		993,000		1928	24.09%	24.10%
56¼	49¼	54¼	57¼	48½	94	38⅛	56,700	155,500	St. Joseph Lead	10	1,952,000	2.00	6 mo.	2.22	2.30
24	21½	23½	24	21	31⅜	19	86,800	194,800	Shell Union Oil	No	13,069,000	1.40	9 mo.	1.39	2.04
67	58⅜	66¼	67	55½	31⅛	51½	141,900	318,000	Standard Oil, Calif.	No	13,016,000	2.50	1928	3.66	3.19
75	58½	74	75	58	83	48	1,337,600	2,130,300	Standard Oil, N. J.	25	25,419,000	1.00	1928	4.43	1.52
35⅞	32	35⅜	35⅞	31½	48⅛	31¾	263,100	575,900	Standard Oil, N. Y.	25	17,380,000	1.60	1928	2.28	0.67
16¼	14	16¼	16½	13	20⅛	9½	17,800	49,300	Tenn. Copper & Chem.	No	857,000	1.00	1928	1.48	0.51
58½	51⅞	58½	58⅝	50¾	71⅞	50	233,300	515,300	Texas Corp.	25	9,851,000	3.00	8 mo.	3.96	5.34
67⅜	59½	64½	67⅜	54¼	85½	42¼	176,800	510,200	Texas Gulf Sulphur	No	2,540,000	4.00		6.40	5.72
105½	91¼	105	105½	76	140	59	711,600	1,750,300	Union Carbide & Carb.	No	9,208,000	2.40	9 mo.	2.89	3.71
74¾	49¾	69¼	74¼	44¾	111⅛	40½	436,500	577,000	United Carbon Co.	No	393,000		9 mo.	1.75	1.99
122¼	98¼	103	139⅜	98¼	243⅛	95	271,500	625,200	U. S. Ind. Alc. Co.	No	373,000	6.00		12.63	10.29
124½	69¼	111½	124½	49¼	116½	37½	611,200	933,800	Vanadium Corp. of Amer.	No	379,000	3.00	6 mo.	3.13	4.53
8¼	5¼	8¼	7⅞	5¼	24¾	3¼	20,800	47,400	Virginia Caro. Chem.	No	479,000			Nil	0.69
34¼	27½	34	32½	26½	65½	15	5,600	14,900	6% cum. part. pfd.	100	214,000			3.06	7.57
81½	78¼	81½	80½	78	97½	69	1,800	3,000	7% cum. prior pfd.	100	144,000	7.00		12.35	20.09
58¼	52	54	59½	37	94¼	30	6,300	23,300	Westvaco Chlorine Prod.	No	123,000	2.00		4.32	3.60
									NEW YORK CURB						
9¼	7¼	9¼	9¼	7¼	23	6	1,400	3,800	Acetol Prod. conv. "A"	No	60,000		1928	2.27	
23¼	20	23¼	24	19	43½	15	1,900	7,500	Agfa Ansco Corp.	No	300,000			Nil	
336½	310¼	336½	345	275	539½	146	4,300	10,900	Aluminum Amer.	No	1,473,000		1928	8.03	5.00
108	106	107½	108½	105½	110	103	7,100	12,100	6% cum. pfd.	100	1,473,000	6.00	1928	14.04	10.26
177	169	177	175	108	280	99½	400	4,100	Aluminum Ltd.	No	573,000		1928	0.02	
...	...	...	...	...	80	25			Amer. Cyanamid "A"	No	66,000	1.60		1.56	3.68
37	125¼	33¾	37	25½	80	20¼	451,100		Amer. Cyanamid "B"	No	1,260,000	1.60		1.56	3.68
28¼	17⅛	28⅛	28	15¼	45¾	1	24,600	31,400	Anglo-Chilean Nitrate	No	1,757,000		6 mo.	Nil	Nil

1930 March High	1930 March Low	1930 Last	1930 High	1930 Low	1929 High	1929 Low	Sales In March	Sales During 1930	ISSUES	Par $	Shares Listed	An. Rate	Earnings $-per share-$ 1929	Earnings $-per share-$ 1928
6⅛	4½	4⅝	6½	4½	35½	3	700	4,400	Assoc. Rayon Corp.	No	1,200,000			
53⅜	48	51⅞	55½	39½	87⅛	30⅛	5,000	16,000	conv. 6% cum. pfd.	100	200,000	6.00		
3½	2⅞	3½	4⅝	2⅞	10¾	3½	600	9,200	Brit. Celanese Am. Rcts.	105	2,200,000			
24½	23	23½	35	23	57½	20	2,500	14,700	Celanese Corp. of Amer.	No	1,000,000		1928 0.67	1.72
84	81	82½	90	80	122	80	1,100	9,000	7% cum. part. 1st pfd.	100	115,000	7.00	1928 12.00	19.59
87	81	82	87	81	100	80	125	2,125	7% cum. prior pfd.	100	115,000	7.00	1928 20.53	
15	14	15	20	13½	50	12	1,100	7,400	Celluloid Corp.	No	195,000		1928 1.29	0.86
68	68	68	68	68	110	82	100	600	7% cum. 1st part. pfd.	No	24,000	7.00	1928 17.33	9.96
62⅞	61	62	62⅞	52	90	40	3,300	12,800	Colgate-Palmolive-Peet	No	2,000,000	2.50	4.03	2.60
13¼	10⅞	11⅛	13½	10⅞	25½	12	1,400	3,900	Courtaulds, Ltd.	1£	24,000,000		1928 19.88%	34.88%
72	71	72	75	71	100½	50	200	1,000	Dow Chemical	No	480,000	2.00		
18⅞	14⅞	15⅛	19½	13¾	22	14⅛	5,300	10,200	Duval Texas Sulphur	No	500,000			
11⅛	8	9	14⅛	8	34¾	10	3,600	14,700	General Ind. Alc.	No	115,000			
154⅞	131½	154	154⅛	131½	209	115	56,700	100,700	Gulf Oil	25	4,415,000	1.50	1928 8.06	3.08
22	20	21	23	20	41½	17⅝	1,000	1,700	Heyden Chemical Corp.	10	150,000		1928 2.02	1.02
6⅜	5¾	6	7	5¾	11⅛	6⅜	600	1,300	Imperial Chem. Ind.	1£			1928 12.15%	10.23%
15	14½	15	16	12	27	13½	200	1,000	Monroe Chem.	No	100,000	1.50	11 mo. 2.93	
42	29⅛	40	42	24	52	21½	18,000	30,900	Newport Co.	No	405,000	2.00	9 mo. 2.18	1.30
78	74⅞	78	79½	74⅞	111⅜	65	400	600	Shawinigan W. & P.	No	1,867,000	2.50	1928 2.17	2.41
80	80	80	105	105	105⅜	75½	100	100	Sherwin-Williams Co.	25	594,000	4.00	7.85	6.99
34¼	26¾	34¼	33¾	18	48¼	14⅞	34,200	73,500	Silica Gel Corp.	No	600,000			
57½	50½	57½	57½	49⅛	63	45	209,200	449,000	Standard Oil Ind.	25	13,927,000	2.50	1928 8.33	3.26
32⅞	30⅝	31⅝	34⅛	30⅝	149⅞	121⅛	5,000	6,500	Swift & Co.	100	1,500,000	8.00	8.71	9.87
139½	110	121	178¾	110	550	111	1,530	8,030	Tubize "B"	No	79,000	10.00		
34	32	30	42	19½	115	15	700	5,100	United Chemicals	No	122,000		0.74	
41	37⅞	39½	44	32	61½	25½	2,600	17,400	$3 cum. part. pfd.	No	120,000	3.00	2.61	
52½	45⅛	51	49⅞	42	90⅝	36½	4,500	10,600	U. S. Gypsum Co.	20	765,000	1.60	6 mo. 2.69	7.21
									CLEVELAND					
135½	135	135½	135½	125	98¾	92	1,116	2,016	Cleve-Cliffs Iron	No	498,000	5.00	1928 8.41	3.80
82	80	82	85	80	105¾	75	839	1,239	Sherwin-Williams Co.	25	594,000	4.00	7.85	6.99
									CHICAGO					
46¾	41½	43	46¾	35	52	36	8,450	12,450	Abbott Labs.	No	120,000	2.00	1928 3.86	2.90
14	12½	14	15	12½	26½	12	1,590	2,890	Monroe Chem.	No	100,000	1.50	11 mo. 2.93	
32	29½	31	35	27	51	30	319	825	$3.50 cum. pref.	No	30,000	3.50	11 mo. 13.00	
32¾	31	32	32¾	31	145	123	20,910	28,210	Swift & Co.	100	1,500,000	8.00	8.71	9.87
...	...	...	38½	38½	60⅞	35	...	100	United Chemicals pfd.	No	120,000	3.00	2.61	
									CINCINNATI					
70	65	65	70	53⅛	100	44¾	7,243	15,250	Proctor & Gamble.	No	6,410,000	2.00	6 mo. 1.82	2.96
									PHILADELHPIA					
98	96	98	98	96	116	89	500	1,800	Pennsylvania Salt	50	150,000	5.00	10.64	8.27
									MONTREAL					
3¾	3	3	3¾	2½	22½	2	1,615	3,900	Asbestos Corp.	No	200,000		1928 Nil	0.87
15	9	15	15	9	68	12	565	850	7% non-cum pfd.	100	75,000		1928 3.36	9.32
9½	7	8½	10½	7	45	5	15,271	29,600	Can. Ind. Alcohol "A"	No	969,000	1.52	1.90	2.87
76	72½	74	80	75	111	65	11,305	56,400	Shawinigan W. & P.	No	2,178,000	2.50	1928 2.17	2.41

The Industry's Bonds

1930 March High	1930 March Low	1930 High	1930 Low	1929 High	1929 Low	Sales In March	Sales During 1930	ISSUE	Date Due	Int. %	Int. Period	Author-ized $
								NEW YORK STOCK EXCHANGE				
104¾	102½	104¾	102½	106½	103	83	219	Amer. Agric. Chem., 1st ref. s. f. 7½s	1941	7½	F. A.	30,000,000
100½	97¼	100½	96	99¾	99¾	153	272	Amer. Cyan. deb. 5s	1942	5	A. O.	5,000,000
108½	102⅛	108½	100	135	95	1,040	3,018	Amer. I. G. Chem. conv. 5½s	1949	5½	M. N.	30,000,000
101⅞	100¼	101⅞	100⅜	102¾	98	268	878	Am. Smelt & Ref. 1st. 5s. "A"	1947	5	A. O.	38,000,000
95	92½	95	83½	100	79	207	388	Anglo-Chilean s. f. deb. 7s	1945	7	M. N.	16,500,000
102½	100¾	102½	100	103½	99⅜	124	287	Atlantic Refin. deb. 5s	1937	5	J. J.	15,000,000
104⅛	100½	104¼	100¼	103	98¼	53	141	By-Prod. Coke 1st 5½s "A"	1945	5½	M. N.	8,000,000
101¾	100¼	102¼	100½	103	96½	3	45	Corn Prod. Refin. 1st s. f. 5s	1934	5	M. N.	10,000,000
...	...	...	...	104	76		651	Lautaro Nitrate conv. 6s	1954	6	J. J.	
100½	99	100½	98	100½	96	609	1,009	Pure Oil s. f. 5½% notes	1937	5½	F. A.	20,000,000
97	94⅞	97	93⅞	98¼	90	67	267	Solvay Am. Invest. 5s	1942	5	M. S.	
103½	102¼	103½	100¼	103½	100	796	1,717	Standard Oil, N. J. deb. 5s	1946	5	F. A.	120,000,000
97¾	95½	97¾	95	100	91¾	385	985	Standard Oil, N. Y. deb. 4½s	1951	4½	J. D.	50,000,000
102	99⅞	102	97½	110	88	187	354	Tenn. Copp. & Chem. deb. 6s. "B"	1944	6	M. S.	5,000,000
								NEW YORK CURB				
102¾	101½	102¾	101½	103½	99⅜	144	563	Aluminum Co., s. f. deb. 5s	1952	5	M. S.	60,000,000
100	97¼	100	97¼	98⅝	97⅜	163	363	Aluminum Ltd., 5s	1948	5	J. J.	20,000,000
100½	96⅝	100½	95	125	99	37	76	Amer. Solv. & Chem. 6½s	1936	6½	M. S.	2,200,000
80	73	80	57	95	60	63	263	General Rayon 6s. "A"	1948	6	J. D.	5,400,000
101¼	100¼	102	101¼	101¼	97¾	73	273	Gulf Oil, 5s	1937	5	J. D.	35,000,000
102¼	101	102¼	100	...	...	133	245	Sinking Fund deb. 5s	1947	5	F. A.	35,000,000
100¼	98	100¼	95¾	100½	93	175	375	Koppers G. & C. deb, 5s	1947	5	J. D.	25,000,000
95	91⅛	95	90⅜	94¾	88½	129	306	Shawinigan W. & P. 4½s	1967	4½	A. O.	200,000,000
94½	91	94½	90	...	...	87	112	4½s., series "B"	1968	4½	M. N.	25,000,000
107	100¾	...	...	...	...	84	177	Silica Gel Corp. 6½s	1932	6½	A. O.	1,700,000
101¼	100¼	101¼	100	102	97¼	153	620	Swift & Co., 5s	1944	5	J. J.	50,000,000
102¼	102¼	103¼	101	104	98	8	97	Westvaco Chlorine Prod. 5½s	1937	5½	M. S.	2,500,000

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The Trend of Prices

Industrial Production Shows Continued Increase During Month

Business and Financial Conditions Continue to Improve Although Still Below Last Year's Level—Improvement Is Not General But Seems Spotty in Character—Chemical Price Tendency Is Generally Downward—Alcohol and Methanol Lower Again.

Business and financial conditions during the past month were marked by an increase in industrial production, a further decline in commodity prices and money rates, and a maintenance of factory pay rolls. While the employment level as a whole remained unchanged, there were increases in the steel, agricultural impletments and tobacco industries, and decreases in textile, automobile tire, electrical machinery and machine tool industries.

In February industrial production increased about 2 per cent, according to the Federal Reserve Board index, which is adjusted to allow for seasonal variations. This increase reflected chiefly a substantial gain in the output of iron and steel. Automobile production was in larger volume than during January, but was 30 per cent smaller than the large output of a year ago. Cotton and wool consumption by mills was substantially lower in February, and production of bituminous coal and copper also decreased.

In the first two weeks of March the output of steel mills declined in comparison with February, contrary to the usual seasonal movement. Bituminous coal output also was smaller.

The volume of building contracts awarded in February was about the same as in the preceding month. Residential building continued at an exceptionally low level while contracts for public works and utilities were large in comparison with the corresponding month is other recent years. Awards in the first two weeks of March were larger than in the first half of February.

The volume of factory employment, which had reached a low point in January, showed little change in February, when an increase usually occurs. Factory pay rolls increased during the month, but by a smaller amount than is usual at this season. In the steel, automobile, agricultural implement, and tobacco industries, employment increased during the four-week period, while further decreases occurred in the cotton and wool textile, lumber, automobile tire, electrical machinery, and machine tool industries.

Freight car loadings on an average daily basis were slightly larger than in January, but smaller than in the corresponding month of any other recent year. Slight seasonal increase was reported during early March.

Wholesale prices of commodities declined further during February, and the Bureau of Labor Statistics index at 92.1 per cent of the 1926 average was at the lowest point since January, 1922. Marked declines occurred during the month in the prices of many agricultural products—grains, hides, raw wool and cotton; in certain imported raw materials, notably sugar and silk; and also in textiles, petroleum, and pig iron.

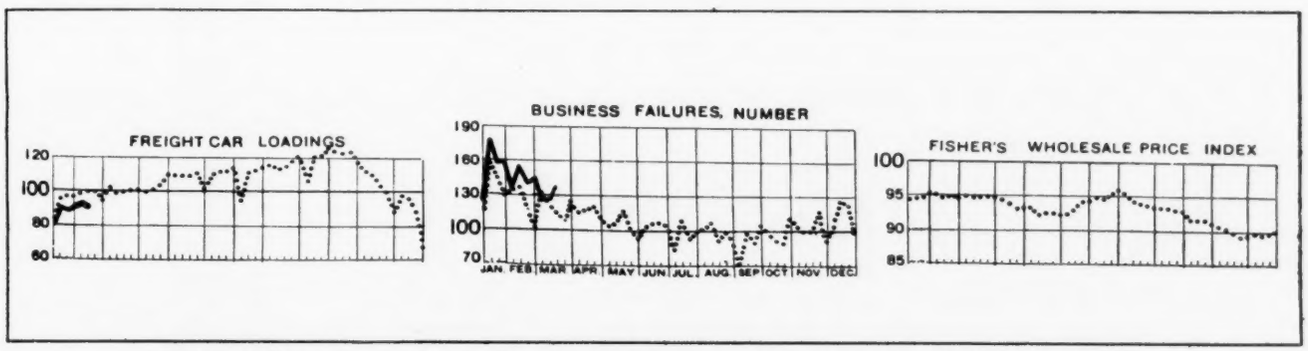
During the first part of March, a number of these commodities declined still further in price. Wheat and cotton prices were considerably lower, and silver reached the lowest point on record. By the middle of the month, however, prices of cotton, hides, and silver had recovered somewhat.

Liquidation of credit at member banks continued throughout February and on February 26 total loans and investments of member banks in leading cities were in about the same volume as in the early Summer of last year. During the following two weeks, however, there was an increase of $230,000,000 in loans and investments, chiefly in loans on securities. All other loans, largely for commercial purposes, increased slightly.

From the middle of February to the middle of March the volume of reserve bank credit outstanding decreased further by $90,000,000. This decline reflected chiefly an increase in gold stock of $75,000,000 and a further decline of money in circulation, offset in part by some increase in member bank reserve balances. Member bank indebtedness at the reserve banks declined to $267,000,000, the lowest level since early in 1925; reserve bank holdings of bills declined, while those of United States securities increased.

Money rates in the open market eased further and bond yields declined rapidly to the lowest level since 1928. At the middle of March the discount rate at the Federal Reserve Bank of New York was reduced from 4 to 3½ per cent, and the rate at the Cleveland, Philadelphia and San Francisco banks from 4½ to 4 per cent.

In the chemical industry, the general level of business continues to rise, although considerably below the level of last year and somewhat below what is generally considered the normal level. The price tendency is also a downward one, which is probably due to competitive conditions arising out of increased production and temporarily decreased consumption. Chief interest has centered about the alcohol—methanol market where these conditions have been intensified.



Business indicators prepared by the Department of Commerce. The weekly average 1923-25 inclusive = 100. The solid line represents 1930 and the dotted line 1929.

Prices Current

Heavy Chemicals, Coaltar Products, Dye-and-Tanstuffs, Colors and Pigments, Fillers and Sizes, Fertilizer and Insecticide Materials, Naval Stores, Fatty Oils, etc.

Chemical prices quoted are of American manufacturers for spot New York, immediate shipment, unless otherwise specified. Products sold f. o. b. works are specified as such. Imported chemicals are so designated. Resale stocks when a market factor are quoted in addition to makers' prices and indicated "second hands."

Oils are quoted spot New York, ex-dock. Quotations f.o.b. mills, or for spot goods at the Pacific Coast are so designated.

Raw materials are quoted New York, f. o. b., or ex-dock. Materials sold f. o. b. works or delivered are so designated.

The current range is not "bid and asked," but are prices from different sellers, based on varying grades or quantities or both. Containers named are the original packages most commonly used.

Purchasing Power of the Dollar: 1926 Average—$1.00 - 1929 Average $1.039 - Jan. 1929 $1.026 - Mar. 1930 $1.102

Acetone — During the past month business has shown some improvement although it is still somewhat below normal. The increased activity was especially noticeable during the closing week of the month. Building activity has seemed especially slow while the rayon industry also seems to be curtailing production and this calling for less acetone. Automobile production is also far below normal. and chiefly confined to low-priced cars. Although business is below normal, prices continue firm on this material and there seems no likelihood of any changes at any time within the near future. It should be pointed out also that March is well ahead of the previous two months of 1930.

Acid Acetic — Demand has not been particularly heavy for this material since both ethyl acetate and rayon, usually large consumers, are somewhat off. Calcium acetate is in rather good supply, stocks being higher than they have been at any time in the past few years. Stocks at the end of January totaled fifteen and a half million pounds, which compares with about 8 million pounds at the end of last year. In addition to plentiful supplies of this material, there has been a large quantity of the synthetic material available, so that all factors have combined to produce an easy condition, although prices are firmly maintained. Nevertheless imports for January totaled 3,594,804 pounds, as compared with 2,982,085 pounds in the same month a year ago.

Acid Chromic — Competition has been fairly keen all throughout the past month, and as a result, prices have declined slightly and are now quoted on the basis of 17c @ 19c lb. Sales and shipments have continued in fair volume.

Acid Formic — Demand for this material has been rather dull due chiefly to the lack of interest shown by the leather and tanning industries. Imports are also off, totaling only 39,200 pounds in January as compared with 137,900 pounds in January a year ago.

Acid Lactic — During the past month, there have been indications of some competition as regards the technical grades

1929 High	1929 Low	1928 High	1928 Low		Current Market	1930 High	1930 Low
.21	.18½	.26	.18½	Acetaldehyde, drs 1c-1 wks...lb.	.18½	.21	.21	.18½
.31	.27			Acetaldol, 50 gal dr.....lb.	.27	.31	.31	.27
				Acetamide.....lb.	1.20	1.35	1.35	1.20
.24	.21	.24	.23	Acetanilid, tech, 150 lb bbl...lb.	.21	.23	.23	.21
				Acetic Anhydride, 92-95%, 100				
.35	.28	.35	.29	lb cbys.....lb.	.27	.28	.29	.27
.32	.30	.....	.....	Acetin, tech drums.....lb.	.30	.32	.32	.30
.16	.11	.15	.13	Acetone,.....lb.	.11	.12	.12	.11
1.25	1.15	1.75	1.65	Acetone Oil, bbls NY.....gal.	1.15	1.25	1.25	1.15
.68	.45	.45	.42	Acetyl Chloride, 100 lb cby...lb.	.55	.68	.68	.55
				Acetylene Tetrachloride (see tetrachlorethane).....				
				Acids				
				Acid Acetic, 28% 400 lb bbls				
3.88	3.88	3.88	3.38	c-1 wks.....100 lb.	.....	3.88	3.88	3.88
13.68	13.68	13.68	11.92	Glacial, bbl c-1 wk.....100 lb.	.....	13.68	13.68	13.68
1.00	.98	1.00	.98	Anthranilic, refd, bbls.....lb.	.98	1.00	1.00	.98
.80	.80	.80	.80	Technical, bbls.....lb.	.....	.80	.80	.80
2.25	1.60	2.25	1.60	Battery, cbys.....100 lb.	1.60	2.25	2.25	1.60
.60	.51	.60	.57	Benzoic, tech, 100 lb bbls....lb.	.51	.53	.53	.51
				Boric, crys. powd, 250 lb.				
.07¾	.05½	.11	.08½	bbls.....lb.	.06½	.07¾	.07¾	.06½
1.25	1.25	1.25	1.25	Broenner's, bbls.....lb.	.....	1.25	1.25	1.25
.90	.85	.90	.85	Butyric, 100% basis cbys.....lb	.85	.90	.90	.85
5.25	4.85	4.85	4.85	Camphoric.....lb.	.....	5.25	5.25	5.25
				Chlorosulfonic, 1500 lb drums				
.05½	.04½	.16	.15	wks.....lb.	.04½	.05½	.05½	.04½
.23	.17½	.30	.25	Chromic, 99%, drs extra.....lb.	.17	.19	.19	.17
1.06	1.00	1.06	1.00	Chromotropic, 300 lb bbls....lb.	1.00	1.06	1.06	1.00
				Citric, USP, crystals, 230 lb.				
.70	.46	.44½	.59	bbls.....lb.	.46	.59	.59	.46
.59	.52	.97	.95	Cleve's, 250 lb bbls.....lb.	.52	.54	.54	.52
.54	.60	.70	.68	Cresylic, 95%, dark drs NY..gal.	.60	.70	.70	.60
.77	.72	.72	.72	97-99%, pale drs NY.....gal.	.72	.77	.77	.72
				Formic, tech 90%, 140 lb.				
.12	.10½	.12	.11	cby.....lb.	.10½	.12	.12	.10½
.12	.50	.55	.50	Gallic, tech, bbls.....lb.	.50	.55	.55	.50
.55	.74	.74	.74	USP, bbls.....lb.	.....	.74	.74	.74
.80	.74	1.06	1.00	Gamma, 225 lb bbls wks.....lb.	.77	.80	.80	.77
.99	.80	.63	.57	H, 225 lb bbls wks.....lb.	.65	.70	.70	.65
.72	.67	.67	.67	Hydriodic, USP, 10% soln cby lb.	.....	.67	.67	.67
.67				Hydrobromic, 48%, coml, 155				
.48	.45	.48	.45	lb cbys wks.....lb.	.45	.48	.48	.45
				Hydrochloric, CP, see Acid				
.....	.....			Muriatic.....			.....	.....
.90	.80	.90	.80	Hydrocyanic, cylinders wks...lb.	.80	.90	.90	.80
				Hydrofluoric, 30%, 400 lb bbls				
.06	.06	.06	.06	wks.....lb.	.....	.06	.06	.06
				Hydrofluosilicic, 35%, 400 lb				
.11	.11	.11	.11	bbls wks.....lb.	.....	.11	.11	.11
				Hypophosphorous, 30%, USP,				
.85	.85	.85	.85	demijohns.....lb.	.....	.85	.85	.85
.05½	.04½	.06	.04½	Lactic, 22%, dark, 500 lb bbls lb.	.04	.04½	.05	.04
.12½	.11	.13½	.12	44%, light, 500 lb bbls.....lb.	.11½	.12	.12	.11
.42	.40	.54	.52	Laurent's, 250 lb bbls.....lb.	.40	.42	.42	.40
.60	.48	.60	.48	Malic, powd., kegs.....lb.	.48	.60	.60	.48
.65	.60	.65	.60	Metanilic, 250 lb bbls.....lb.	.60	.65	.65	.60
				Mixed Sulfuric-Nitric.....				
.07¾	.07	.08	.07¾	tanks wks.....N unit	.07	.07¾	.07¾	.07
.01	.008	.01½	.01	tanks wks.....S unit	.008	.01	.01	.008
.21	.18	.21	.18	Monochloroacetic, tech bbl..lb.	.18	.21	.21	.18
1.70	1.65	.65	.65	Monosulfonic, bbls.....lb.	1.65	1.70	1.70	1.65
				Muriatic, 18 deg, 120 lb cbys				
1.40	1.35	1.40	1.35	c-1 wks.....100 lb.	.....	1.35	1.35	1.35
1.00	1.00			tanks, wks. 100 lb.		1.00	1.00	1.00
....	1.45	1.80	1.70	20 degrees, cbys wks...100 lb.	.....	1.45	....	1.45
.95	.85	.95	.85	N & W, 250 lb bbls.....	.85	.95	.95	.85
.59	.55	.59	.55	Naphthionic, tech, 250 lb.....	.....	Nom.	Nom.	.....
				Nitric, 36 deg, 135 lb cbys c-				
5.00	5.00	5.00	5.00	wks.....100 lb.	.....	5.00	5.00	5.00
				40 deg, 135 lb cbys, c-1				
6.00	6.00	6 00	6.00	wks.....100 lb.	.....	6.00	6.00	6.00
.11¾	.11	.11½	.10¾	Oxalic, 300 lb bbls wks NY...lb.	.11½	.11¾	.11¾	.11½
.14	.08	.08½	.08	Phosphoric 50%, U. S. P.....lb.	.....	.14	.14	.14
.16	.14	.16	.16	Syrupy, USP, 70 lb drs....lb.	.....	.14	1	.14
.70	.65	.50	.50	Picramic, 300 lb bbls.....lb.	.65	.70	.70	.65
.50	.30	.50	.40	Picric, kegs.....lb.	.30	.50	.50	.30
				Pyrogalic, crystals.....				
1.40	.86	.86	.86	.....lb.	1.30	1.40	1.40	1.30
.42	.33	.32	.27	Salicylic, tech, 125 lb bbl.....lb.	.33	.37	.37	.33
.16	.15	.16	.15	Sulfanilic, 250 lb bbls.....lb.	.15	.16	.16	.15
				Sulfuric, 66 deg, 180 lb cbys				
1.95	1.60	1.95	1.60	1c-1 wks.....100 lb.	1.60	1.95	1.95	1.60
15.50	15.50			tanks, wks. ton		15.50	15.50	15.50
1.65	1.50	1.37½	1.20	1500 lb dr wks.....100 lb.	1.50	1.65	1.65	1.50
1.42½	1.27½	1.12½	1.12½	60°, 1500 lb dr wks....100 lb.	1.27½	1.42½	1.42½	1.27½
				Oleum, 20%, 1500 lb. drs 1c-1				
18.50	18.50	18.50	18.50	wks .....ton	.....	18.50	18.50	18.50
42.00	42.00	42 00	42.00	40%, 1c-1 wks net .....ton	.....	42.00	42.00	42.00

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Purchasing Power of the Dollar: 1926 Average—$1.00 - 1929 Average $1.039 - Jan. 1929 $1.026 - Mar. 1930 $1.102

of this material. This has been reflected in slightly lower prices. The U. S. P. grades, on the other hand, have seemed to be in exceptionally good demand from the food and beverage industries.

Acid Muriatic — This market continues rather steady with shipments reported as being in good volume.

Acid Sulphuric — In common with the other mineral acids, shipments of sulfuric have shown a steadily rising trend since the close of last year. The volume is not, of course, up to that of last year at this time, but the general level is quite satisfactory and but little below what might be considered normal.

Alcohol — The market on the denatured grades is reported as being reasonably firm in view of the hectic condition which have prevailed for over a month. With the closing season, there has been but little business available. However, the closing weeks of the month have shown some slight improvement in volume of shipments. Prices are now quoted on the basis of 42c gal in tanks. In addition to price cutting within the industry, which had become general in nature the situation was further aggravated by the threat of competition from methanol. Although the lateness of the season prevented any real indication of the extent to which methanol could compete, it is reported that all efforts will be directed towards marketing the latter as an anti-freeze in competition with denatured alcohol, when the next season draws round. According to estimates, there will be a surplus of about six to eight million gallons of methanol to be diverted into channels formerly occupied by denatured alcohol. At the same time, it must be pointed out that alcohol should be in a much more favorable position to compete next season. Unreasonably high prices were paid for molasses during last season, and as a result production costs were unusually high. Since molasses has been and can be sold at much lower levels, it seems quite likely that radically reduced raw material prices will place alcohol in much better position to meet this new competition. Shipments of butyl alcohol are reported to be moving in good volume.

Ammonia — No concerted movement of this material has as yet evidenced itself, although the first signs of warmer weather will start the movement in large quantity.

Ammonium Chloride — Producers of this material continue to direct their efforts towards new markets for this material, since sales are showing a de-

1929 High	1929 Low	1928 High	1928 Low		Current Market	1930 High	1930 Low
.40	.30	.40	.30	Tannic, tech, 300 lb bbls...lb.	.30	.40	.40	.30
.38½	.38	.38	.34½	Tartaric, USP, crys, powd, 300 lb. bbls.....lb.	.38	.38½	.38½	.38
.85	.85	.85	.85	Tobias, 25o lb bbls .....lb.	.....	.85	.85	.85
2.75	2.75	2.75	2.75	Trichloroacetic bottles.....lb.	.....	2.75	2.75	2.75
2.00	2.00	2.00	2.00	Kegs.....lb.	.....	2.00	2.00	2.00
2.25	1.00	1.25	1.00	Tungstic, bbls.....lb.	1.40	1.70	1.70	1.40
.47	.38	.55	.43	Albumen, blood, 225 lb bbls..lb.	.38	.40	.40	.38
.20	.12			dark,.....bbls., lb.	.12	.20	.20	.12
.83	.70	.84	.78	Egg, edible.....lb.	.69	.73	.75	.69
.80	.70	.80	.70	Technical, 200 lb cases ..lb.	.68	.72	.73	.68
.65	.60	.65	.60	Vegetable, edible.....lb.	.60	.65	.65	.60
.55	.50	.55	.50	Technical.....lb.	.50	.55	.55	.50
				Alcohol				
.17¼	.17¼	.20	.18¼	Alcohol Butyl, Normal, 50 gal drs c-l wks.....lb.	.17¼	.18¼	.18¼	.17¼
.18¼	.17¼	.19¼	.18¼	Drums, 1-c-l wks.....lb.	.17¼	.18¼	.18¼	.17¼
.17¼	.16¼	.19	.17¼	Tank cars wks.....lb.	.16¼	.17¼	.17¼	.16¼
1.67	1.67	2.25	1.75	Amyl (from pentane) drs c-l wks.....gal.	.....	1.67	1.67	1.67
1.80	1.42	1.80	1.70	Diacetone, 50 gal drs del..gal.	1.42	1.60	1.60	1.42
2.75	2.69½	3.70	2.65	Ethyl, USP, 190 pf, 50 gal bbls.....gal.	2.63	2.75	2.75	2.63
.71	.71	.55	.50	Anhydrous, drums.....gal.	.....	.71	.71	.71
.52	.49	.52	.48½	Completely denatured, No. 1, 188 pf, 50 gal drs drums extra.....gal.	.....	.45	.51	.45
.51	.48	.50	.43	No. 5, 188 pf, 50 gal drs. drums extra.....gal.	.....	.44	50	.44
.50	.46	.46	.41	Tank, cars.....gal.	.....	.42	.48	.42
1.30	1.00	1.25	1.00	Isopropyl, ref, gal drs.....gal.	.60	1.00	1.00	.60
1.00	1.00	1.00	1.00	Propyl Normal, 50 gal dr..gal.	.....	1.00	1.00	1.00
.82	.80	.82	.80	Aldehyde Ammonia, 100 gal dr lb.	.80	.82	.82	.80
.65	.65	.65	.65	Alpha-Naphthol, crude, 300 lb bbls.....lb.	.....	.65	.65	.65
.34	.32	.37	.35	Alpha-Naphthylamine, 350 lb bbls.....lb.	.32	.34	.34	.32
3.50	3.25	3.30	3.25	Alum Ammonia, lump, 400 lb bbls, lc-l wks.....100 lb.	3.30	3.50	3.50	3.30
5.50	5.00	5.50	5.25	Chrome, 500 lb casks, wks .....100 lb.	5.00	5.25	5.25	5.00
3.50	3.00	3.20	3.10	Potash, lump, 400 lb casks wks.....100 lb.	3.20	3.50	3.50	3.20
3.75	3.75	3.75	3.75	Soda, ground, 400 lb bbls wks.....100 lb.	.....	3.75	3.75	3.75
24.30	24.30	26.00	24.30	Aluminum Metal, c-l NY.100 lb.	.....	24.30	24.30	24.30
.20	.05	.40	.35	Chloride Anhydrous,.....lb.	.05	.15	.15	.05
.18	.17	.18	.17	Hydrate, 96%, light, 90 lb bbls.....lb.	.17	.18	.18	.17
.26	.25	.24	.18	Stearate, 100 lb bbls.....lb.	.25	.26	.26	.25
2.05	1.95	1.75	1.75	Sulfate, Iron, free, bags c-l wks.....100 lb.	1.95	2.05	2.05	1.95
1.40	1.40	1.40	1.40	Coml, bags c-l wks..100 lb.	.....	1.40	1.40	1.40
1.15	1.15	1.15	1.15	Aminoazobenzene, 110 lb kegs lb.	.....	1.15	1.15	1.15
				Ammonium				
.14½	.14	.14	.13½	Ammonia, anhyd, 100 lb cyl..lb.	.15½	.15½	.15½	.15½
.03¼	.03½	.03	.03	Water, 26°, 800 lb dr del...lb.	.....	.03½	.03¼	.03½
				Acetate.....lb.	.28	.39	.39	.28
6.50	5.15			Bicarbonate, bbls., f.o.b. plant .....100 lb.	.....	5.15	5.15	5.15
.22	.21	.22	.21	Bifluoride, 300 lb bbls.....lb.	.21	.22	.22	.21
.12	.09	.09	.08¼	Carbonate, tech, 500 lb cs..lb.	.09	.12	.12	.09
5.15	4.45	5.15	4.45	Chloride, white, 100 lb. bbls wks.....100 lb.	4.45	5.15	5.15	4.45
5.75	5.25	5.75	5.25	Gray, 250 lb bbls wks....lb.	5.25	5.75	5.75	5.25
.11½	.11	.11½	.11	Lump, 500 lb cks spot...lb.	.11	.11½	.11½	.11
.16	.15	.16	.15	Lactate, 500 lb bbls.....lb.	.15	.16	.16	.15
.10	.06	.10	.06	Nitrate, tech, casks.....lb.	.06	.10	.10	.06
.34	.26	.38	.27½	Persulfate, 112 lb kegs.....lb.	.26	.30	.30	.26
.13	.12½	.18	.18	Phosphate, tech, powd, 325 lb bbls.....lb.	.12½	.13	.13	.12½
2.40	2.05	2.90	2.20	Sulfate, bulk c-l.....100 lb.	.....	2.10	2.10	2.10
2.45	2.05	3.00	2.50	Southern points.....100 lb.	.....	2.10	2.10	2.10
60.85	52.40	60.85	60.85	Nitrate, 26% nitrogen 31.6% ammonia imported bags c. i. f.....ton	.....	57.60	57.60	57.60
.48	.36	.60	.55	Sulfocyanide, kegs.....lb.	.36	.48	.48	.36
1.70	1.60	2.25	1.72	Amyl Acetate, (from pentane) drs.....lb.	.222	.236	.236	.222
.24	.23	.....	.....	Tech., drs.....lb.	.23	.24	.24	.23
				Alcohol, see Fusel Oil.....				
				Furoate, 1 lb tins.....lb.		5.00	5.00	5.00
.16½	.15	.16½	.15½	Aniline Oil, 960 lb drs.....lb.	.15	.16	.16	.15
.37	.34	.48	.41	Annatto, fine.....lb.	.34	.37	.37	.34
.90	.80	1.00	.90	Anthraquinone, sublimed, 125 lb bbls.....lb.	.80	.90	.90	.80
.10	.08½	.12	.09½	Antimony, metal slabs, ton lots .....lb.	.....	.09½	.09½	.08½
.10	.09	.12	.10	Needle, powd, 100 lb cs....lb.	.....	.09½	.09½	.09½
.18	.13	.18	.17	Chloride, soln (butter of) sbys.....lb.	.13	.17	.17	.13
.10	.08½	.12	.09½	Oxide, 500 lb bbls.....lb.	.....	.08½	.08½	.08½
.26	.24	.....	.....	Salt, 66%, tins.....lb.	.....	.24	.24	.24
.20	.16	.20	.16	Sulfuret, golden, bbls.....lb.	.16	.20	.20	.16
.42	.38	.42	.38	Vermilion, bbls.....lb.	.38	.42	.42	.38
.19	.17	.19	.17	Archil, conc, 600 lb bbls.....lb.	.17	.19	.19	.17
.14	.12	.14	.12	Double, 600 lb bbls.....lb.	.12	.14	.14	.12
.16	.12	.16	.15	Triple, 600 lb bbls.....lb.	.12	.14	.14	.12
.18¼	.18¼	.16	.15	Argols, 80%, casks.....lb.	.....	.18½	.18½	.18½
.08	.08	.08	.08	Crude, 30%, casks.....lb.	.08	.08	.08	.08
.11	.09	.11	.10½	Arsenic, Red, 224 lb kegs, cs..lb.	.09	.11	.11	.09
.04½	.04	.04	.03½	White, 112 lb kegs.....lb.	.04	.04½	.04½	.04
15.00	4.75	14.75	14.75	Asbestine, c-l wks.....ton	.....	15.00	15.00	15.00

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Prices Current and Comment

Purchasing Power of the Dollar: 1926 Average—$1.00 - 1929 Average $1.039 - Jan. 1929 $1.026 - Mar. 1930 $1.102

cided trend downward with the falling off of consumption by the radio industry. The market continues steady and firm.

Ammonium Sulfate — During the past month the movement of this material has shown a decided improvement. Although quoted prices remain unchanged at $2.10 per 100 lbs., there has been some little resale material available at lower prices. However, there has been an active demand for spot material and the market appears to be in much better shape.

Antimony — With the uncertainty regarding the tariff removed by the Senate action in retaining the old rate of 2c lb., the metal market assumed a much lower price level. Quotations are at 8c lb., representing a decline of 1¼c lb. since last quoted. However, there has been no increase in the amount of business and the market has been firm although inactive. Oxide is at 8½c lb., while needle, powdered, is at 9½c. lb.

Beeswax — Prices advanced in this market following the action of the Senate in placing a duty of 12 per cent on crude beeswax. This material had formerly entered free of duty. The duty on refined was also raised, the new rate being 27 per cent. Prices went higher following this tariff decision so that crude is now at 34c lb., and refined at 38c lb.

Benzene — Continues to move in fairly large volume although continued low production of automobiles keeps consumption rather below normal. Exports of benzol registered a 56 per cent increase in quantity correlatively with a 72 per cent gain in value, last year, as compared with the previous year. Department of Commerce reports. A secure foothold was obtained in 1929 in two markets—Italy and Norway—not previously penetrated; outgoing shipments to these two destinations were valued at $214,739 and $110,424 respectively. Germany continues reinforcing its position as the outstanding purchaser of American benzol. The following table sets forth the principal markets (with the exception of Italy and Norway) during 1928 and 1929:

Countries	*1928 Quantity gallons*	*1929 Quantity gallons*
Germany	10,824,326	17,828,355
United Kingdom	6,559,186	9,251,276
Netherlands	....	1,921,733
France	1,380,235	1,326,496
Belgium	2,277,075	1,194,059

Blood — Stocks have been fairly heavy during the past month, and this factor, combined with continued lack of demand,

1929 High	1929 Low	1928 High	1928 Low		Current Market	1930 High	1930 Low
				Barium			
60.00	57.00	57.00	47.00	Barium Carbonate, 200 lb bags wks....ton	58.00	60.00	58.00
.15	.14	.12½	.12	Chlorate, 112 lb kegs NY..lb.	.14	.15	.14
69.00	63.00	65.00	54.00	Chloride, 600 lb bbl wks...ton	63.00	69.00	63.00
.13	.12	.13½	.13	Dioxide, 88%, 690 lb drs...lb.	.12	.13	.12
.05½	.04½	.04½	.04½	Hydrate, 500 lb bbls.....lb.	.04½	.05½	.04½
.08½	.08	.08	.07½	Nitrate, 700 lb casks.....lb.	.08	.08½	.08
24.00	23.00	24.00	23.00	Barytes, Floated, 350 lb bbls wks....ton	23.00	24.00	24.00
8.00	5.00	8.00	5.00	Bauxite, bulk, mines.....ton	5.00	8.00	8.00
.37	.34	.38	.36	Beeswax, Yellow, crude bags..lb.	.....	.34	.34
.42	.39	.43	.41	Refined, cases.....lb.	.....	.38	.38
.53	.51	.58	.56	White, cases.....lb.	.51	.53	.53
.65	.60	.70	.65	Benzaldehyde, technical, 945 lb drums wks.....lb.	.60	.65	.65
				Benzene			
.23	.23	.23	.21	Benzene, 90%, Industrial, 8000 gal tanks wks.....gal.	.....	.22	.22
.23	.23	.23	.21	Ind. Pure, tanks works....gal.	.....	.22	.22
.74	.70	.74	.70	Benzidine Base, dry, 250 lb bbls.....lb.	.65	.67	.74
1.00	1.00	1.00	1.00	Benzoyl, Chloride, 500 lb drs.lb.	.....	1.00	1.00
.25	.25	.25	.25	Benzyl, Chloride, tech drs....lb.	.....	.25	.25
.26	.22	.26	.24	Beta-Naphthol, 250 lb bbl wk.lb.	.22	.24	.24
1.35	1.35	1.35	1.35	Naphthylamine, sublimed, 200 lb bbls.....lb.	.....	1.35	1.35
.68	.60	.65	.63	Tech, 200 lb bbls.....lb.	.60	.65	.65
90.00	75.00	90.00	80.00	Blanc Fixe, 400 lb bbls wks..ton	75.00	90.00	90.00
				Bleaching Powder			
2.25	2.00	2.25	2.25	Bleaching Powder, 300 lb drs c-l wks contract.....100 lb.	2.00	2.35	2.35
4.60	3.90	5.25	4.65	Blood, Dried, fob, NY.....Unit	.....	3.70	3.90
5.00	4.40	5.35	4.75	Chicago.....Unit	.....	4.00	4.50
4.70	4.25	5.05	4.50	S. American shipt.....Unit	.....	3.50	4.10
.35	.32	.35	.31	Blues, Bronze Chinese Milori Prussian Soluble.....lb.	.....	.35	.35
42.00	39.00	30.00	29.00	Bone, raw, Chicago.....ton	.....	39.00	39.00
.07	.06	.07	.06	Bone, Ash, 100 lb kegs.....lb.	.06	.07	.07
.08½	.08½	.08½	.08½	Black, 200 lb bbls.....lb.	.....	.08½	.08½
35.00	30.00	37.00	31.00	Meal, 3% & 50%, Imp....ton	.....	31.00	31.00
.03½	.02½	.05	.2½	Borax, bags.....lb.	.02½	.03½	.03½
.14	.10½	.12	.10½	Bordeaux, Mixture, 16% pwd..lb.	.12	.14	.14
.14	.10	.10	.08	Paste, bbls.....lb.	.12	.14	.14
28.00	26.00	28.00	26.00	Brazilwood, sticks, shpmt....lb.	26.00	28.00	28.00
				Bromine, cases.....lb.	.45	.47	.47
1.20	.60	1.20	.60	Bronze, Aluminum, powd blk.lb.	.60	1.20	1.20
1.25	.55	1.25	.55	Gold bulk.....lb.	.55	1.25	1.25
.195	.184	1.60	1.40	Butyl, Acetate, normal drs..... lb.	.192	.198	.20
.186	.181	1.55	1.35	Tank, wks.....lb.	.....	.186	.186
.70	.34	.70	.70	Aldehyde, 50 gal drs wks...lb.	.34	.44	.44
.....	.....			Carbitol s ee Diethylene Glycol Mono (Butyl Ether).....	.....	.....	.....
				Cellosolve (see Ethylene glycol mono butyl ether).....			
.50	.50			Furoate, tech., 50 gal. dr., lb.	.....	.50	.50
.36	.25	.36	.34	Propionate, drs.....lb.	.25	.27	.27
.60	.25	.60	.60	Stearate, 50 gal drs.....lb.	.25	.30	.30
.60	.57	.60	.57	Tartrate, drs.....lb.	.57	.60	.60
1.75	.75	2.00	1.35	Cadmium, Sulfide, boxes.....lb.	.95	1.75	1.75
				Calcium			
4.50	4.50	4.50	3.50	Calcium, Acetate, 150 lb bags c-l.....100 lb.	.....	4.50	4.50
.09	.07	.09	.06	Arsenate, 100 lb bbls c-l wks.....lb.	.07	.09	.09
.06	.05	.06	.05	Carbide, drs.....lb.	.05	.06	.06
1.00	1.00	1.00	1.00	Carbonate, tech, 100 lb bags c-l.....lb.	1.00	1.00	1.00
25.00	22.75	27.00	25.00	Chloride, Flake, 375 lb drs c-l wks.....ton	.....	22.75	22.75
20.00	20.00	23.00	20.00	Solid, 650 lb drs c-l fob wks .....ton	20.00	20.00	20.00
52.00	42.00	52.00	52.00	Nitrate, 100 lb bags.....ton	42.00	43.00	43.00
1.25	1.25	.....	.....	Peroxide, 100 lb. drs.....lb.	.....	1.25	1.25
.08	.07	.08	.07	Phosphate, tech, 450 lb bbls lb.	.08	.08½	.08½
.26	.25			Stearate, 100 lb bbls.....lb.	.25	.26	.26
88.15	82.15			Calurea, bags S. points, c.i.f. ton	.....	88.65	88.65
.18	.18	.18	.18	Camwood, Bark, ground bbls..lb.	.....	.18	.18
.24	.22	.28	.22	Candelilla Wax, bags.....lb.	.....	.19	.20
.....	.....			Carbitol, (See Diethylene Glycol Mono Ethyl Ether).....	.....	.....	.....
.15	.08	15	.08	Carbon, Decolorizing, 40 lb bags c-l.....lb.	.08	.15	.15
.12	.12	12	12	Black, 100-300 lb cases 1c-l NY.....lb.	.....	.12	.12
.06	.05½	.06	.05½	Bisulfide, 500 lb drs 1c-l NY.....lb.	.05½	.06	.06
.06	.06	.06	.06	Dioxide, Liq. 20-25 lb cyl...lb.	.....	.06	.06
.07½	.06½	.07½	07	Tetrachloride, 1400 lb drs delivered.....lb.	.06½	.07	.07
.43	.35	.58	.45	Carnauba Wax, Flor, bags....lb.	.32	.33	.37
.40	.33	.60	.40	No. 1 Yellow, bags.....lb.	.30	.31	.33
.32	.28	.38	.34	No. 2 N Country, bags.....lb.	.26	.27	.27
.36	.31	.56	.38	No. 2 Regular, bags.....lb.	.28	.29	.30
.25	.24	.32	.25	No. 3 N. C.....lb.	.22	.23	.23
.26	.24	.32	25½	No. 3 Chalky.....lb.	.22	.23	.23
.17	.15	.18½	.14½	Casein, Standard, ground.....lb.	.14	.15	.15½

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Prices Current and Comment

Purchasing Power of the Dollar: 1926 Average—$1.00 - 1929 Average $1.039 - Jan. 1929 $1.026 - Mar. 1930 $1.102

has resulted in much lower prices. Quotations are at $3.70 per unit in New York; $4.00 per unit, Chicago; and $3.50 per unit, South American.

Butyl Acetate — Supplies of this material continue to be rather plentiful. The anti-dumping order issued during the past month has had no apparent effect upon present conditions in the market. Imports registered a 48 per cent increase in quantity and a 40 per cent increase in value during 1929 over the preceding year. A total of 7,924,244 pounds, valued at $982,053 were entered for consumption in 1929 as against 5,347,902 pounds, valued at $701,827 in 1928. Imports by quarters during 1929 were as follows: January—March, 2,260, 677 pounds, valued at $288,882; April-June, 2,137,514 pounds, valued at $264, 944; July-September, 1,495,633 pounds, valued at $182,550; and October-December, 2,030,420 pounds, valued at $245,677.

Calcium Acetate — Although it is reported that business continues to show some slight improvement, the volume is still below normal. Production of acetate of lime during January amounted to 11,798,080 pounds as compared with 11,666,000 pounds during December and 11,995,876 pounds during January of last year. Stocks at the end of January totaled 15,553,062 pounds, as compared with 7,760,733 pounds on December 31. Supplies of the material are plentiful and the demand thus far continues well below normal, but the market is firm at quoted prices. Calcium acetate imports into the United States from Canada decreased in 1929 in comparison with the previous year. In 1929 there were entered for consumption 8,308,752 pounds, valued at $355,996, compared with 9,005,148 pounds in 1928, valued at $316,273.

Calcium Chloride — The seasonal highway demand for this material is already beginning to make itself felt. Shipments and sales are showing a decidedly upward tendency, and each month thus far has shown an improvement over the corresponding month of last year.

Carbon Black — Curtailed automobile production is having its effect upon this market, through lessened tire production, and consequently smaller than normal demand at present for carbon black. The Department of Commerce reported a 21 per cent increase in exports of carbon black during 1929 as compared with the preceding year, these rising from 77,903,153 pounds, with a value of $6,794, 224, to 91,829,215 pounds worth $8,270, 837, a gain of $1,486,613. The four

1929 High	1929 Low	1928 High	1928 Low		Current Market	1930 High	1930 Low
				Cellosolve (see Ethylene glycol mono ethyl ether)			
				Acetate (see Ethylene glycol mono ethyl ether acetate)			
.30	.20	.30	.26	Celluloid, Scraps, Ivory cs....lb.	.....	.20	.20	.20
.20	.18	.20	.18	Shell, cases.....lb.	.18	.20	.20	.18
.32	.15	.32	.30	Transparent, cases.....lb.	.....	.15	.15	.15
1.25	1.20	1.40	1.40	Cellulose, Acetate, 50 lb kegs .lb.	1.10	1.25	1.25	1.10
.03½	.03	.03½	.03	Chalk, dropped, 175 lb bbls...lb.	.03	.03½	.03½	.03
.03½	.02	.04½	.04½	Precip, heavy, 560 lb cks...lb.	.02	.03½	.03½	.02
.03½	.03½	.03½	.02½	Light, 250 lb casks.....lb.	.02½	.03½	.03½	.02½
.19	.18	.19	.18	Charcoal, Hardwood, lump, bulk wks.....bu.	.18	.19	.19	.18
.06½	.06	.06½	.06	Willow, powd, 100 lb bbl wks.....lb.	.06	.06½	.06½	.06
.05	.04	.05	.04	Wood, powd, 100 lb bbls...lb.	.04	.05	.05	.04
.02	.03½	.03	.02	Chestnut, clarified bbls wks,..lb.	.02½	.03	.03	.02½
.02½	.01½	.02	.01½	25% tks wks.....lb.	.01½	.02½	.02½	.01½
.04 5/8	.04½	.04 5/8	.04 5/8	Powd, 60%, 100 lb bgs wks.lb.	.....	.04½	.04½	.04½
.06	.05½	.06	.05½	Powd, decolorized bgs wks..lb.	.05½	.06	.06	.05½
9.00	8.00	9.00	8.00	China Clay, lump, blk mines.ton	8.00	9.00	9.00	8.00
.02	.01½	.02	.01½	Powdered, bbls.....lb.	.01½	.02	.02	.01½
12.00	10.00	12.00	10.00	Pulverized, bbls wks.....ton	10.00	12.00	12.00	10.00
25.00	15.00	25.00	15.00	Imported, lump, bulk.....ton	15.00	25.00	25.00	15.00
.03½	.01½	.03½	.03	Powdered, bbls.....lb.	.01½	.03	.03	.01½
				Chlorine				
.08½	.07	.09	.08	Chlorine, cyls lc-1 wks contract .....lb.	.07½	.08½	.08½	.07½
.04½	.04½	.....	.....	cyls, cl wks,. contract ...lb.	.....	.04½	.04½	.04½
.03	.025	.03½	.03½	Liq tank or multi-car lot cyls wks contract.....lb.	.025	.025	.025	.025
.10½	.08½	.07	.07	Chlorobenzene, Mono, 100 lb. drs lc-1 wks.....lb.	.10	.10½	.10½	.10
.20	.16	.22	.20	Chloroform, tech, 1000 lb drs..lb.	.15	.16	.16	.15
1.35	1.00	1.35	1.00	Chloropicrin, comml cyls.....lb.	1.00	1.35	1.35	1.00
.29	.26	.29	.26	Chrome, Green, CP.....lb.	.26	.29	.29	.26
.11	.06½	.11	.06½	Commercial.....lb.	.06½	.11	.11	.06½
.18	.15	.17	.15½	Yellow.....lb.	.17	.18	.18	.17
.05½	.04½	.05½	.04½	Chromium, Acetate, 8% Chrome bbls.....lb.	.04½	.05½	.05½	.04½
.05½	.05½	.05½	.05½	20° soln, 400 lb bbls.....lb.	.....	.05½	.05½	.05½
.28	.27	.28	.27	Fluoride, powd, 400 lb bbl..lb.	.27	.28	.28	.27
.35½	.34½	.35½	.34½	Oxide, green, bbls.....lb.	.34½	.35½	.35½	.34½
10.50	10.00	9.50	9.00	Coal tar, bbls.....bbl	10.00	10.50	10.50	10.00
2.22	2.10	2.22	2.10	Cobalt Oxide, black, bags....lb.	2.10	2.22	2.22	2.10
1.01	.95	.87	.84	Cochineal, gray or black bag..lb.	.95	1.01	1.01	.95
.95	.95	.86	.86	Teneriffe silver, bags.....lb.	.....	.95	.95	.95
				Copper				
24.00	17.00	17.00	12.90	Copper, metal, electrol...100 lb.	.....	17.78	17.78	17.78
.25	.13	.17½	.16	Carbonate, 400 lb bbls.....lb.	.13	.21½	.21½	.13
.28	.25	.28	.28	Chloride, 250 lb bbls.....lb.	.25	.28	.28	.25
.60	.44	.50	.48	Cyanide, 100 lb drs.....lb.	.44	.45	.45	.44
.32	.16½	.17	.16½	Oxide, red, 100 lb bbls.....lb.	.24	.32	.32	.24
.19	.18	.19	.18	Sub-acetate verdigris, 400 lb bbls.....lb.	.18	.19	.19	.18
7.00	5.50	5.50	5.05	Sulfate, bbls c-1 wks...100 lb.	.....	5.50	5.50	5.50
14.00	13.00	14.00	13.00	Copperas, crys and sugar bulk c-1 wks.....ton	13.00	14.00	14.00	13.00
1.35	1.25	1.35	1.25	Sugar, 100 lb bbls.....100 lb.	1.25	1.35	1.35	1.25
.42	.40	.42	.40	Cotton, Soluble, wet, 100 lb bbls.....lb.	.40	.42	.42	.40
.....	.....	.....	.....	Cottonseed, S. E. bulk c-1...ton	.....	.....	.....	.....
.....	.....	.....	.....	Meal S. E. bulk.....ton	.....	.....	.....	.....
38.00	37.50	38.00	36.00	7% Amm., bags mills...ton	37.50	38.00	38.00	37.50
.28	.26½	.27½	.26	Cream Tartar, USP, 300 lb. bbls.....lb.	.26½	.27	.27	.26½
.42	.40½	.42	.40	Creosote, USP, 42 lb cbys....lb.	.40	.42	.42	.40
.19	.15	.19	.17	Oil, Grade 1 tanks.....gal.	.15	.16	.16	.15
.23	.13	.23	.21	Grade 2.....gal.	.13	.14	.14	.13
.28	.13	.28	.25	Grade 3.....gal.	.13	.14	.14	.13
.17	.14	.20	.17½	Cresol, USP, drums.....lb.	.14	.17	.17	.14
.36	.32			Crotonaldehyde, 50 gal dr....lb.	.32	.36	.36	.32
.17	.16	.17	.16	Cudbear, English.....lb.	.16	.17	.17	.16
.16	.12½	.18½	.18½	Cutch, Rangoon, 100 lb bales..lb.	.12½	.13	.13	.12½
.08½	.08	.07	.06	Borneo, Solid, 100 lb bale..lb.	.08	08½	.08½	.08
2.00	2.00	1.75	1.67½	Cyanamide, bulk c-1 wks Nitrogen unit.....	.....	2.00	2.00	2.00
4.92	4.62	5.12	3.77	Dextrin, corn, 140 lb bags.100 lb.	4.52	4.72	4.82	4.52
4.87	4.57	5.07	3.72	White, 130 lb bags.....100 lb.	4.47	4.67	4.77	4.47
.09	.08	.09	.08	Potato, Yellow, 220 lb bgs..lb.	.08	.09	.09	.08
.09	.08	.09	.08	White, 220 lb bags lc-1....lb.	.08	.09	.09	.08
.08½	.08	.08½	.08	Tapioca, 200 lb bags lc-1...lb.	.08	.08½	.08½	.08
3.80	3.80	3.80	3.80	Diamylphthalate, drs wks...gal.	.....	3.80	3.80	3.80
3.10	2.70	2.90	2.85	Dianisidine, barrels.....lb.	.....	2.70	2.70	2.70
.26½	.26½	.28	.26½	Dibutylphthalate, wks.....lb.	.25½	.28	.28	.25½
.31½	.29½	.31½	.29½	Dibutyltartrate, 50 gal drs....lb.	.29½	.31½	.31½	.29½
.13	.05	.....	....	Dichloroethylether, 50 gal drs lb.	.05	.07	.07	.05
.65	.55	.65	.55	Dichloromethane, drs wks....lb.	.55	.65	.65	.55
3.00	2.75	.25	.23	Diethylamine, 400 lb drs.....lb.	2.75	3.00	3.00	2.75
1.90	1.85	2.15	2.15	Diethylcarbonate, drs .....gal.	1.85	1.90	1.90	1.85
.60	.55	2.00	1.85	Diethylaniline, 850 lb drs.....lb.	.55	.60	.60	.55
.13	.10	.60	.55	Diethyleneglycol, drs.....lb.	.11	.13	.13	.10
.15	.13	.15	.10	Mono ethyl ether, drs....lb.	.13	.15	.15	.13
.30	.25	.35	.25	Mono butyl ether, drs....lb.	.28	.30	.30	.28
.15	.13			Mono methyl ether, 50 gal. dr.....lb.	.15	.18	.18	.15
.22	.15	.....	.....	Diethylene oxide, 50 gal dr....lb.	.....	.50	.50	.50
.50	.50	.....	.....	Diethylorthotoluidin, drs.....lb.	.64	.67	.67	.64
.67	.64	.67	.64	Diethyl phthalate, 1000 lb drums.....lb.	.24	.26	.26	.24
.26	.24	.26	.24	Diethylsulfate, technical, 50 gal drums.....lb.	.30	.35	.35	.30
.35	.30	.35	.30	Dimethylamine, 400 lb drs...lb.	.....	2.62	2.62	2.62
2.62	2.62	2 62	2.62	Dimethylaniline, 340 lb drs...lb.	.26	.28	.28	.26
.32	.26	.32	.30					

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Prices Current and Comment

Purchasing Power of the Dollar: 1926 Average—$1.00 - 1929 Average $1.039 - Jan. 1929 $1.026 - Mar. 1930 $1.102

largest consumers both in 1928 and 1929 were the United Kingdom, France, Germany and Canada. These showed respective gains in imports of American carbon black last year over the preceding one of approximately $300,000, $330,000, $187,000 and $180,000. The exports to Russia one of the smaller consumers, increased more than three-fold. the gain in value being almost $100,000. This gain was linked with the larger consumption of crude rubber by the U. S. S. R. Japan and Italy each showed decreases last year as against 1928 in their imports, however, the former taking about $14,000 less of domestic carbon black and the latter about $73,000 less. China showed a decrease in the quantity imported but an increase of a minor nature in the value. Other countries to disclose substantial gains were Australia, with a gain of $200,000, and Belgium, with one of $90,000.

Carnauba Wax — There has been a continued lack of demand during the past month and as a result all grades are lower in price. Quotations are as follows: Flor, 32c @ 33c lb.; No. 1, yellow, 30c @ 31c lb.; No. 2 NC, 26c @ 27c lb.; No. 2, regular, 28 @ 29c lb.; No. 3 NC, 22c @ 23c lb.; and No. 3, chalky, 22c @ 23c lb.

Casein — Of chief interest during the past month was the action of the Senate in placing a 5½c lb. duty on this material. Although demand continued at a standstill, prices advanced as might be expected. Casein imports into the United States totaled 27,583,339 pounds, valued at $3,677,941. This compares with 28,651,215 pounds, imported during 1928. By far the bulk of the imports came from the Argentine which furnished 23,138,945 pounds in 1928 and 22,799,885 pounds in 1929. Casein production in the United States, according to preliminary figures, amounted to 6,414,000 pounds, the output of 151 factories, during the third quarter of 1929. This brings total reported domestic production of casein for the first nine months of 1929 up to approximately 22,984,000 pounds. In 1928, United States production in the third quarter amounted to 6,191,000 pounds, the nine months' total aggregating 18,722,000 pounds.

Chlorine — The market is reported as being stable at quoted prices, with no important buying being done since practically all business is secured under contract. Shipments are said to be holding up well in general volume although those to the paper and glass industries are rather below normal.

1929 High	1929 Low	1928 High	1928 Low		Current Market	1930 High	1930 Low
.50	.45	.50	.45	Dimethylsulfate, 100 lb drs...lb.	.45	.50	.50	.45
.16½	.15	.16½	.15½	Dinitrobenzene, 400 lb bbls...lb.	.15½	.16½	.16½	.15½
.15	.1:	.16	.15	Dintrochlorobenzene, 400 lb bbls.....lb.	.13	.15	.15	.13
.37	.34	.34	.32	Dinitronaphthalene, 350 lb bbls .....lb.	.34	.37	.37	.34
.32	.31	.32	.31	Dinitrophenol, 350 lb bbls....lb.	.31	.32	.32	.31
.19	.17	.19	.18	Dinitrotoluene, 300 lb bbls...lb.	17	.18	.18	.17
.49	.42	90	.48	Diorthotolyguanidine, 275 lb bbls wks.....lb.	.42	.46	.46	.42
.....	.....	.....	.....	Dioxan (See Diethylene Oxide)	.....	.....	...	.....
.50	.40			Diphenyl.....lb.	.30	.40	.50	.30
.47	.40	.47	.45	Diphenylamine.....lb.	.....	.40	.40	.40
.40	.39	.72	.40	Diphenylguanidine, 100 lb bbl lb.	.30	.35	.35	.30
.30	.26	.30	.26	Dip Oil, 25%, drums.....lb.	.26	.30	.30	.26
57.00	46.50	62.00	58.00	Divi Divi pods, bgs shipmt..ton	.....	42.00	46.50	42.00
.05½	.05	.05½	.05	Extract.....lb.	.05	.05½	.05½	.05
.84	.77	.82	.73	Egg Yolk, 200 lb cases.....lb.	.75	.78	.80	.75
1.90	1.70	1.75	1.7	Epsom Salt, tech, 300 lb bbls c-1 NY.....100 lb.	1.70	1.90	1.90	1.70
.39	.38	.38	.37	Ether, USP, 600 lb. drs.....lb.	.....	.14	.14	.14
				Anhydrous, C.P. 300 lb. drs.lb.	.....	.40	.40	.40
.122	.108	1.05	.75	Ethyl Acetate, 85% Ester, ... tanks.....lb.	.....	.115	.115	.115
.129	.111	1.25	1.10	drums.....lb.	.121	.127	.158	.121
				Anhydrous, tanks.....lb.	.....	.142	.142	.142
				drums.....lb.	.149	.156	.156	.149
.68	.65	.....	.....	Acetoacetate, 50 gal drs....lb.	.65	.68	.68	.65
1.11	1.05	1.11	1.05	Benzylaniline, 300 lb drs...lb.	1.05	1.11	1.11	1.05
.55	.50	.70	.70	Bromide, tech, drums .....lb.	.50	.55	.55	.50
1.90	1.85	.....	.....	Carbonate, 90%, 50 gal drs gal.	1.85	1.90	1.90	1.85
.22	.22	.22	.22	Chloride, 200 lb. drums....lb.	.....	.22	.22	.22
.40	.35	.....	.....	Chlorocarbonate, cbys.....lb.	.....	.30	.40	.30
.52	.50	.....	.....	Ether, Absolute, 50 gal drs..lb.	.50	.52	.52	.50
5.00	5.00			Furoate, 1 lb tins .....lb.	.....	5.00	5.00	5.00
.35	.25	3.50	3.50	Lactate, drums works.....lb.	.25	.29	.29	.25
.30	.30	.30	.30	Methyl Ketone, 50 gal drs..lb.	.....	.30	.30	.30
.55	.45	.55	.45	Oxalate, drums works.....lb.	.45	.55	.55	.45
.36	.30	.36	.30	Oxybutyrate, 50 gal drs wks.lb.	.....	.30½	.30½	.30½
.70	.79	.70	.70	Ethylene Dibromide, 60 lb dr .lb.	.....	.70	.70	.70
.85	.75	.85	.75	Chlorhydrin, 40%, 50 gal drs chloro. cont.....lb.	.75	.85	.85	.75
.10	.05	.11	.07	Dichloride, 50 gal drums...lb.	.05	.07	.07	.05
30	.25	.40	.25	Glycol, 50 gal drs wks.....lb.	.25	.28	.28	.25
.31	.23	.37	.31	Mono Butyl Ether drs wks.	.23	.27	.27	.23
.24	.16	.20	.24	Mono Ethyl Ether drs wks	.16	.20	.20	.16
.26	.19	.23	26	Mono Ethyl Ether Acetate dr. wks.....	.19	.23	.23	.19
.23	.19			Mono Methyl Ether, drs.lb.	.19	.23	.23	.19
				Oxide, cyl.....lb.	.....	2.00	2.00	2.00
.65	.45	.65	.62	Ethylidenaniline.....lb.	.45	.47½	.47½	.45
25.00	20.00	25.00	20.00	Feldspar, bulk.....ton	25.00	20.00	25.00	20.00
21.00	15.00	21.00	15.00	Powdered, bulk works.....ton	15.00	21.00	21.00	15.00
.09	.05	.09	.07½	Ferric Chloride, tech, crystal 475 lb bbls.....lb.	.05	.07½	.07½	.05
4.25&10	3.65&10	5.50&10	4.90&10	Fish Scrap, dried, wks.....unit	.....	4.35&10	4.35&10	.....
4.00&50	3.50&50	4.75&50	4.00&50	Acid, Bulk 7 & 3½% delivered Norfolk & Balt. basis...unit	.....	3.50&50	3.50&50	.....
46.00	41.00	25.00	25.00	Fluorspar, 98%, bags.....	41.00	46.00	46.00	41.00

Formaldehyde

.....	.....	.....	.....	Formaldehyde, aniline, 100 lb. drums.....lb.	.....	.....	.....	.....
.42	.37½	.42	.39	USP, 400 lb bbls wks.....lb.	.37½	.42	.42	.37½
.10	.08½	.09	.08½	Fossil Flour.....lb.	.07½	.07¾	.08	.07½
.04	.02½	.04	.02½	Fullers Earth, bulk, mines..ton	.02½	.04	.04	.02½
20.00	15.00½	20.00	15.00	Imp. powd c-1 bags.....ton	15.00	20.00	20.00	15.00
30.00	25.00	30.00	25.00	Furfural 500 lb drums, C. P..lb.	25.00	30.00	30.00	25.00
.19¼	.17	.19½	.1.½	Furfuramide (tech) 100 lb dr..lb.	.....	.15	.15	.15
.30	.30	.....	.....	Furfuryl Acetate, 1 lb tins....lb.	.....	.30	.30	.30
5.00	5.00	.....	.....	Alcohol, (tech) 100 lb dr....lb.	.....	5.00	5.00	5.00
.50	.50	.....	.....	Furoic Acid (tech) 100 lb dr...lb.	.....	.50	.50	.50
1.00	.50	.....	.....	Fusel Oil, 10% impuritiies ...gal.	.. ..	1.35	1.35	1.35
1.35	1.35	1.35	1.3	Fustic, chips.....lb.	.04	.05	.05	.04
.05	.04	.05	.04	Crystals, 100 lb boxes.....lb.	.20	.22	.22	.20
.22	.20	.22	.20	Liquid, 50°, 600 lb bbls....lb.	.09	.10	.10	.09
.10	.09	.10	.09	Solid, 50 lb boxes.....lb.	.14	.16	.16	.14
.16	.14	.23	.20	Sticks.....ton	25.00	26.00	26.00	25.00
26.00	25.00	32.00	30.00	G Salt paste, 360 lb bbls.....lb.	.45	.50	.50	.45
.52	.45	.52	.50	Gall Extract.....lb.	.18	.20	.20	.18
.21	.18	21	.20	Gambier, common 200 lb ca...lb.	.06	.07	.07	.06
.07	06	.09	.08	25% liquid, 450 lb bbls....lb.	.08	.10	.10	.08
.14	.08	.14	.12	Singapore cubes, 150 lb bg..lb.	.08½	.09	.09	.08½
.09	.08½	.12	.11	Gelatin, tech, 100 lb cases....lb.	.45	.50	.50	.45
.50	.45	.50	.45	Glauber s Salt, tech, c-1 wks.....100 lb.	1.00	1.70	1.70	1.00
1.70	.70	1.00	.70	Glucose (grape sugar) dry 70-80° bags c-1 NY.....100 lb.	3.24	3.34	3.34	3.24
3.34	3.20	3.34	3.24	Tanner's Special, 100 lb bags .....100 lb.	.....	3.14	3.14	3.14
3.14	3.14	3.14	3.14	Glue, medium white, bbls ...lb.	.20	.24	.24	.20
.24	.20	.24	.20	Pure white, bbls.. .....lb.	.22	.26	.26	.22
.26	.22	.26	.22	Glycerin, CP, 550 lb drs.....lb.	.14	.14½	.14½	.14
.16	.13½	.19	.15	Dynamite, 100 lb drs..... lb.	.12	.12½	.12½	.12
.12½	.10½	.15	11½	Saponification, tanks.....lb.	.07½	.08	.08	.07½
.08½	.07½	.10½	.08½	Soap Lye, tanks.....lb.	07	.07½	.07½	.07
.07½	.06½	.09½	.07½	Graphite, crude, 220 lb bgs...ton	15.00	35.00	35.00	15.00
35.00	15.00	35.00	15.00	Flake, 500 lb bbls.....lb.	.06	09	.09	.06
.09	.06	.09	.06					

Gums

.04½	.03	.04½	.03½	Gum Accroides, Red, coarse and fine 140-150 lb bags.....lb.	.03½	.04½	.04½	.03½
.06½	.06½	.06½	.06	Powd, 150 lb bags.....lb.	.06	.06½	.06½	.06

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Prices Current and Comment

Purchasing Power of the Dollar: 1926 Average—$1.00 - 1929 Average $1.039 - Jan. 1929 $1.026 - Mar. 1930 $1.102

Copper Sulfate — Demand continues to improve and is reported as being much better although by no means up to that of last year which was the biggest on record. Although the past month's shipments are larger in volume than those of February, they total about one million pounds under those of March of last year. Agricultural demand is now fairly under way although it will reach no large proportions much before the middle of May. At that time, it appears quite likely that prices may advance, since that has always been the tendency in past seasons. Prices at present are firm with little likelihood of immediate change, since the opinion is expressed on all sides that metal prices will probably remain steady. The past month has also witnessed a continued demand for material for export, but it seems quite likely that this season is now over. The present outlook is for active business in this material for the next three or four months.

Ethyl Acetate — Business continues in routine volume with the market firm at quoted prices.

Fish Scrap — Material for May-June shipment is now being offered at $4.35 & 10 per unit, while acid, on the same basis is offered at $3.50 & 50 per unit.

Formaldehyde — Demand from the plastic continues in good volume for this material. Prices are reported to be firm at the lower figures recently established due to conditions in the raw material market. With the greatly lowered production costs consequent upon lower raw material prices, it was inevitable that prices should go lower in consequence.

Glycerin — The market continues dormant and with but little sign of any renewed interest. Reports from aboard indicate that conditions are even worse there. Exports during January totaled 38,025 pounds, as compared with 119,660 pounds in 1929. Imports for that month were 189,142 pounds of crude and 97,815 pounds of refined, a total of 286,957 pounds, against a total of 1,950,691 pounds for the same month of last year. Total exports for 1929 amounted to 1,493,520 pounds, as against 2,066,717 pounds exported during the previous year; while imports totaled 19,982,017 pounds, as with 8,789,314 pounds imported during 1928.

Gums — Prices on Damar, Mastic and Sandarac have declined during the past month due to the presence of more stocks

1929 High	1929 Low	1928 High	1928 Low		Current Market	1930 High	1930 Low
.20	.18	.20	.18	Yellow, 150-200 lb bags....lb.	.18	.20	.20	.18
.40	.35	.40	35	Animi (Zansibar) bean & pea 250 lb cases.....lb.	.35	.40	.40	.35
.55	.50	.55	.50	Glassy, 250 lb cases.....lb.	.50	.55	.55	.50
.12	.09	.12	.09	Asphaltum, Barbadoes (Manjak) 200 lb bags.....lb.	.09	.12	.12	.09
.17	.15	.17	.15	Egyptian, 200 lb cases.....lb.	.15	.17	.17	.15
65.00	58.00	65.00	55.00	Gilsonite Selects, 200 lb bags .....ton	58.00	65.00	65.00	58.00
.26	.22	.26	.22½	Damar Batavia standard 136, lb cases.....lb.	.18½	.19	.20	.18½
.11	.10½	.11	.10½	Batavia Dust, 160 lb bags....lb.	.10	.10½	.11	.10
.17½	.15	.17½	.16	E Seeds, 136 lb cases.....lb.	.11½	.12½	.13	.11½
.13½	.13	.14½	.13	F Splinters, 136 lb cases and bags.....lb.	.10½	.11	.13½	.10½
.30½	.26	.30½	.29½	Singapore, No 1, 224 lb cases lb.	.23½	.24	.24	.23½
24	.21½	.24	.20	No. 2, 224 lb cases.....lb.	.19½	.20½	.20½	.19½
.14	.1[illegible]	.15	.13½	No. 3, 180 lb bags.....lb.	.10	.11½	.11½	.10
.40	.38	.48	.33	Benzoin Sumatra, U. S. P. 120 lb cases.....lb.	.38	.40	.40	.38
.17	.14	.15	.14	Copal Congo, 112 lb bags, clean opaque.....lb.	.16	.17	.17	.16
.09	.08½	.09	.08½	Dark, amber.....lb.	.07½	.08	.08	.07½
.14	.12½	.14	.12½	Light, amber.....lb.	.12½	.14	.14	.12½
.36	.35	.36	.35	Water white.....lb.	.37	.45	.45	.37
.65	.58	.65	.58	Mastic.....lb.	.60	.62	.65	.60
.17½	.17	.17½	.16	Manila, 180-190 lb baskets Loba A.....lb.	.17	.17½	.17½	.17
.16½	.15½	.16½	.15	Loba B.....lb.	.15½	.16	.16½	.15½
.14½	.13½	.14	.13	Loba C.....lb.	.13½	.14	.14	.13½
.19	.17	.19	.16	Pale bold, 224 lb cs.....lb.	.17	.19	.19	.17
.13½	.13	.13½	.12	Pale nubs.....lb.	.13	.13½	.13½	.13
.11	.10	.11	.07½	East Indies chips, 180 lb bags lb.	.10	.11	.11	.10
.21	.20	.21	.17	Pale bold, 180 lb bags....lb.	.18½	.19	.21	.18½
.16	15	.16	.14	Pale nubs.....lb.	.13½	.14	.16	.13½
		.....	.....	Pontianak, 224 lb cases....				
.23	.20	.25½	.22	Pale bold gen No 1.....lb.	.20	.21	.21	.20
.15	.14½	.15	.13	Pale gen chips spot.....lb.	.14½	.15	.15	.14½
.14	.13½	.14	.13	Elemi, No. 1, 80-85 lb cs...lb.	.13½	.14	.14	.13½
.13½	.13	.13½	.13	No. 2, 80-85 lb cases.....lb.	.13	.13½	.13½	.13
.13	.12	.13	.12	No. 3, 80-85 lb cases.....lb.	.12	.13	.13	.12
.57	.50	.57	.50	Kauri, 224-226 lb cases No. 1 .....lb.	.50	.57	.57	.50
.38	.35	.38	.35	No. 2 fair pale.....lb.	.35	38	.38	.35
.12	.10	.12	.10	Brown Chips, 224-226 lb cases.....lb.	.10	.12	.12	.10
		.....	.....	Bush Chips, 224-226 lb.				
.40	.38	.40	.38	cases.....lb.	.38	.40	.40	.38
		.....	.....	Pale Chips, 224-226 lb cases				
.26	.24½	.26	.24½	.....lb.	.24½	.26	.26	.24½
.72	.35	.60	.26	Sandarac, prime quality, 200 lb bags & 300 lb casks...lb	.33	.35	.40	.33
.20	.17	.....	.....	Helium, 1 lit. bot. .....lit.	.....	25.00	25.00	25.00
.20	.14	.20	.17	Hematine crystals, 400 lb bbls lb.	.14	.18	.18	.14
.11	.11	.11	.11	Paste, 500 bbls.....lb.	.....	.11	.11	.11
.03½	.03	.03½	.03½	Hemlock 25%, 600 lb bbls wks lb.	.03	.03½	.03½	.03
17.00	16.00	16.00	16.00	Bark.....ton	.....	16.00	16.00	16.00
.60	.60	.60	.60	Hexalene, 50 gal drs wks.....lb.	.....	.60	.60	.60
.58	.48	.56	.62	Hexamethylenetetramine, drs lb.	.48	.50	.50	.48
4.00	3.75	4.00	4.00	Hoof Meal, fob Chicago....unit	.....	3.75	3.75	3.75
3.90	3.75	.....	.....	South Amer. to arrive....unit	.....	3.75	3.75	3.75
.26	.24	.26	.24	Hydrogen Peroxide, 100 vol, 140 lb cbys.....lb.	.24	.26	.26	.24
				Hydroxyamine Hydrochloride lb.	.....	3.15	3.15	3.15
.15	.12	.15	.12	Hypernic, 51°, 600 lb bbls....lb.	.12	.15	.15	.12
1.30	1.28	1.30	1.28	Indigo Madras, bbls.....lb.	1.28	1.30	1.30	1.28
.18	.15	.18	.15	20% paste, drums.....lb.	.15	.18	.18	.15
.12	.12			Synthetic, liquid.....lb.	.....	.12	.12	.12
				Iron Chloride, see Ferric or Ferrous				
.10	.09	.10	.09	Iron Nitrate, kegs.....lb.	.09	.10	.10	.09
3.25	2.50	3.25	2.50	Coml, bbls.....100 lb.	2.50	3.25	3.25	2.50
.12	.10	.12	.10	Oxide, English.....lb.	.10	.12	.12	.10
.03½	.02½	.03½	.02½	Red, Spanish.....lb.	.02½	.03½	.03½	.02½
.90	.85	.90	.85	Isopropyl Acetate, 50 gal drs gal.	.85	.90	.90	.85
.18	.16	.20	.17	Japan Wax, 224 lb cases.....lb.	.14½	.15	.15½	.14½
70.00	60.00	70.00	60.00	Kieselguhr, 95 lb bgs NY....ton	60.00	70.00	70.00	60.00
13.50	13.00	.....	.....	Lead Acetate, bbls wks...100 lb.	13.00	13.50	13.50	13.00
14.50	14.00	13.50	13.00	White crystals, 500 lb bbls wks.....100 lb.	14.00	14.50	14.50	14.00
.15	.13	.15	.13	Arsenate, drs 1c-1 wks.....lb.	.13	.16	.16	.13
				Dithiofuroate, 100 lb dr....lb.	.....	1.00	1.00	1.00
7.75	6.10	6.25	6.25	Metal, c-1 NY.....100 lb.	.....	7.75	7.75	6.10
.14	.14	.14	.14	Nitrate, 500 lb bbls wks....lb.	.....	.14	.14	.14
.18	.17½	.18	.17½	Oleate, bbls.....lb.	.17½	.18	.18	.17½
.08½	.08½	.08½	.08½	Oxide Litharge, 500 lb bbls lb.	.....	.08½	.08½	.08½
.09½	.09½	.09½	.09½	Red, 500 lb bbls wks....lb.	.....	.09½	.09½	.09½
.09½	.09	.09	.09	White, 500 lb bbls wks...lb.	.....	.09½	.09½	.09½
.08½	.08½	.08½	.08½	Sulfate, 500 lb bbls wk...lb.	.....	.08½	.08½	.08½
57.00	52.00			Leuna saltpetre, bags c.i.f....ton	.....	57.60	57.60	57.60
57.30	52.30			S. points c. i. f.....ton	.....	57.90	57.90	57.90
4.50	4.50	4.50	4.50	Lime, ground stone bags.....ton	.....	4.50	4.50	4.50
1.05	1.05	1.05	1.05	Live, 325 lb bbls wks...100 lb.	.....	1.05	1.05	1.05
				Lime Salts, see Calcium Salts				
.17	.15	.17	.15	Lime-Sulfur soln bbls.....gal.	.15	.17	.17	.15
.06½	.05½	.06½	.06½	Lithopone, 400 lb bbls 1c-1 wks .....lb.	.....	.05½	.05½	.05½
.08½	.08½	.08½	.08½	Logwood, 51°, 600 lb bbls.....lb.	.08½	.08½	.08½	.08½
.03½	.03	.03½	.03	Chips, 150 lb bags.....lb.	.03	.03½	.03½	.03
.12½	.12½	.12½	.12½	Solid, 50 lb boxes.....lb.	.....	.12½	.12½	.12½
26.00	24.00	27.00	26.00	Sticks.....ton	24.00	26.00	26.00	24.00
.08	.07½	.08	.07½	Lower grades.....lb.	.07½	.08	.08	.07½
.25	.22	.30	.30	Madder, Dutch.....lb.	.22	.25	.25	.22
60.00	50.00	50.00	48.00	Magnesite, calc, 500 lb bbl...ton	50.00	60.00	60.00	50.00

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Purchasing Power of the Dollar: 1926 Average—$1.00 - 1929 Average $1.039 - Jan. 1929 $1.026 - Mar. 1930 $1.102

in the spot market. It is pointed out, however, that lower prices on Sandarac do not represent a logical decline, and that the situation there is merely a temporary one induced by local competitive conditions. Conditions in the primary market for Kauri gum are reported as being very unfavorable for the next crop. The crop is reported as being destroyed to a great extent by the unusually heavy rainfall, as January and February were both the wettest of those months on record. Singapore is an important market for both copal and damar gums where supplies are graded, classified and repacked for shipment. It is estimated that approximately 75 per cent of the copal gum exports come from the surrounding islands and about the same quantity of damar gum shipments originate in Siam, Netherland, Borneo, British Borneo, and Sumatra. Singapore is, however, gradually declining as a collecting center for copal gum and the loss in trade is attributed to direct shipments from producing areas. Declared exports of copal gum to the United States in 1929 aggregated 1,426,008 pounds, valued at $164,287 as against 2,030,031 pounds, valued at $227,724 for 1928. Damar gum exports on the other hand were higher and advanced from 2,413,560 pounds, valued at $932,733 during 1928 to 2,633,215 pounds, valued at $856,743 last year. The latter quantity increase is partially accounted for by increased demand resulting from substitution of damar gum for copal gum. Exports of copal gum from Antwerp to the United States were lower in quantity last year than for 1928. The comparative figures for the two years were 8,191,968 pounds, valued at $498,131 in 1928, and 7,895,275 pounds, having a value of $500,189 during 1929.

Mercury — Prices have shown a decidedly downward tendency during the past month due to the presence of domestic material on the market in large quantities. This condition, of course, can only be a temporary one since the imported material rules the market and must eventually return to set the market pace. For the present, however, comparatively large supplies of domestic material have had a weakening effect upon the market.

Methanol — The past month has witnessed a further reduction in price as producers have made further strenuous efforts to market the surplus occasioned by the increased production. The lower prices are directed towards securing broad-

1929 High	1929 Low	1928 High	1928 Low		Current Market	1930 High	1930 Low
				Magnesium			
.06½	.06	.06½	.06	Magnesium Carb, tech, 70 lb bags NY....lb.	06	.06½	.06½	.06
36.00	36.00	37.00	27.00	Chloride flake, 375 lb. drs c-l wks....ton	.....	36.00	36.00	36.00
33.00	33.00	33.00	33.00	Imported shipment....ton	.....	33.00	33.00	33.00
31.00	31.00	31.00	31.00	Fused, imp, 900 lb bbls NY ton	.....	31.00	31.00	31.00
.10½	.10	.10½	.10	Fluosilicate, crys, 400 lb bbls wks....lb.	.10	.10½	.10½	.10
.42	.42	.42	.42	Oxide, USP, light, 100 lb bbls ....lb.	.....	.42	.42	.42
.50	.50	.50	.50	Heavy, 250 lb bbls....lb.	.....	.50	.50	.50
1.25	1.00	.....	.....	Peroxide, 100 lb cs....lb.	1.00	1.25	1.25	1.00
.10½	.09½	.10½	.09½	Silicofluoride, bbls....lb.	.09½	.10½	.10½	.09½
.26	.25	.25	.23	Stearate, bbls....lb.	.25	.26	.26	.25
.24	.19	.24	.24	Manganese Borate, 30%, 200 lb bbls....lb.	.....	.19	.19	.19
.08½	.08	.08½	.08	Chloride, 600 lb casks....lb.	.08	.08½	.08½	.08
.06	.04½	.....	.....	Dioxide, tech (peroxide) drs lb.	.04½	.06	.06	.04½
		.50	.35	Ore, powdered or granular				
.03½	.02½	.03½	.03	75-80%, bbls....lb.	.02½	.03	.03	.02½
.04½	.03½	.04½	.04	80-85%, bbls....lb.	.....	.03½	.03½	.03½
.05½	.04	.05½	.05	85-88%, bbls....lb.	.04	.04½	.04½	.04
.08½	.07	.07½	.07	Sulfate, 550 lb drs NY....lb.	.07	.08	.08	.07
Nom.	.03½	Nom.	.03½	Mangrove 55%, 400 lb bbls...lb.	.03½	Nom.	Nom.	.03½
35.00	30.00	45.00	39 000	Bark, African....ton	.....	33.00	33.00	33.00
15.00	14.00	12.00	10.00	Marble Flour, bulk....ton	14.00	15.00	15.00	14.00
2.05	2.05			Mercurous chloride ....lb.	.....	2.05	2.05	2.05
126.00	120.00	132.00	121.00	Mercury metal....75 lb flask	121.00	122.50	124.50	121.00
.74	.67	.74	.72	Meta-nitro-aniline....lb.	.67	.69	.69	.67
1.55	1.50	1.80	1.50	Meta-nitro-para-toluidine 200 lb. bbls....lb.	1.50	1.55	1.55	1.50
.90	.80	.94	90	Meta-phenylene-diamine 300 lb. bbls....lb.	.80	.84	.84	.80
.72	.67	.74	.72	Meta-toluene-diamine, 300 lb bbls....lb.	.67	.69	.69	.67
				Methanol			
.65	.51	.58	.46	Methanol, (Wood Alcohol), 95%....gal.	.38	.42	.48	.38
.65	.53	.60	.47	97%....gal.	.39	.43	.49	.39
.68	.53	.63	.44	Pure....gal.	.40½	.44½	.50	.40½
.66	.54	.58	.48	Synthetic....gal.	.40½	.44½	.50	.40½
.62	.55	.75	.45	Denat. gre. tanks....gal.	.....	.45	.45	.45
.95	.95	.95	.95	Methyl Acetate, drums....gal.	.....	Nom.	Nom.	Nom.
.85	.73	.90	.68	Acetone, 100 gal drums...gal.	.73	.77	.77	.73
.95	.85	.95	.85	Anthraquinone, kegs....lb.	.85	.95	.85	.95
.....	.....	.....	.....	Cellosolve, (See Ethylene Glycol Mono Methyl Ether)	.....	.....	.....	.....
.60	.45	60	.55	Chloride, 90 lb cyl....lb.	.45	.45	.45	.45
.50	.50			Furoate, tech., 50 gal. dr., .lb.	.....	.50	.50	.50
80.00	65.00	80.00	65.00	Mica, dry grd. bags wks....lb.	65.00	80.00	80.00	65.00
115.00	110.00	115.00	110.00	Wet, ground, bags wks....lb.	110.00	115.00	115.00	110.00
3.00	3.00	.....	.....	Michler's Ketone, kegs....lb.	.....	3.00	3.00	3.00
.75	.70	.75	.70	Monochlorobenzene, drums see, Chorobenzene, mono....lb.	.70	.75	.75	.70
				Monoethylorthotoluidin, drs. lb.				
4.20	3.75	4.20	3.95	Monomethylparaminosufate 100 lb drums....lb.	3.75	4.00	4.00	3.75
.07	.06½	.07	.06½	Montan Wax, crude, bags....lb.	.06½	.07	.07	.06½
.04½	.03½	.04½	.04½	Myrobalans 25%, liq bbls....b	.03½	.04½	.04½	.03½
.08½	.05	.08½	.08	50% Solid, 50 lb boxes....lb.	.05	.05½	.05½	.05
43.00	40.00	50.00	42.00	J1 bags....ton	.....	41.00	41.00	41.00
40.00	26.50	40.00	32.50	J 2 bags....ton	.....	26.50	26.50	26.50
34.00	27.50	40.00	32.50	R 2 bags....ton	.....	27.50	27.50	27.50
.18	.16	.18	.18	Naphtha, v. m. & p. (deodorized) bbls....gal.	.....	.16	.16	.16
.05½	.05½	.06	.05½	Naphthalene balls, 250 lb bbls wks....lb.	.....	.05½	.05½	.05½
.04½	.04½	.04½	.04½	Crushed, chipped bgs wks..lb.	.....	.04½	.04½	.04½
.05	.05	.05	.05	Flakes, 175 lb bbls wks....lb.	.....	.05	.05	.05
.24	.20	.24	.21	Nickel Chloride, bbls kegs....lb.	.20	.21	.21	.20
.40	.37	.38	.35	Oxide, 100 lb kegs NY....lb.	.37	.40	.40	.37
.13	.13	.09½	.09	Salt bbl. 400 bbls lb NY...lb.	.....	.13	.13	.13
.13	.13	.09	.08½	Single, 400 lb bbls NY....lb.	.....	.13	.13	.13
1.30	1.25	1.30	1.25	Nicotine, free 40%, 8 lb tins, cases....lb.	1.25	1.30	1.30	1.25
1.20	.98½	1.20	.98½	Sulfate, 10 lb tins....lb.	.98½	1.20	1.20	.98½
18.00	12.00	14.00	13.00	Nitre Cake, bulk....ton	14.00	16.00	18.00	14.00
.10½	.09	.10½	.10½	Nitrobenzene, redistilled, 1000 lb drs wks....lb.	.09	.09½	.09½	.09
.36	.25	Nom.	.40	Nitrocellulose, c-l-l-cl, wks...lb.	.25	.36	.36	.25
4.00	3.40	4.00	3.35	Nitrogenous Material, bulk..unit	.....	3.25	3.40	3.25
.25	.25	.25	.25	Nitronaphthalene, 550 lb bbls.lb.	.....	.25	.25	.25
.15	.14	.15	.14	Nitrotoluene, 1000 lb drs wks.lb.	.14	.15	.15	.14
.16½	.16	Nom.	.25	Nutgalls Aleppy, bags....lb.	.16	.16½	.16½	.16
.13	.12	.18	.17	Chinese, bags....lb.	.12	.13	.13	.12
50.00	30.00	50.00	45.00	Oak Bark, ground....ton	30.00	35.00	35.00	30.00
23.00	20.00	23.00	20.00	Whole....ton	20.00	23.00	23.00	20.00
.13½	11½	.13½	.13	Orange-Mineral, 1100 lb casks NY....lb.	.11½	.13	.13	.11½
2.25	2.15	2.25	2.20	Orthoaminophenol, 50 lb kgs..lb.	2.15	2.25	2.25	2.15
2.60	2.50	2.50	2.35	Orthoanisidine, 100 lb drs....lb.	2.50	2.60	2.60	2.50
.65	.50	.65	.50	Orthochlorophenol, drums....lb.	.50	.65	.65	.50
.28	.18	.28	.18	Orthocresol, drums....lb.	.25	.25	.35	.18
.10	.07	.07	.06	Orthodichlorobenzene, 1000 lb drums....lb.	.07	.10	.10	.07
.33	.30	.35	.32	Orthonitrochlorobenzene, 1200 lb drs wks....lb.	.30	.33	.33	.30
.18	.16	.18	.17	Orthonitrotoluene, 1000 lb drs wk....lb.	.16	.18	.18	.16
.90	.85	.90	.85	Orthonitrophenol, 350 lb dr...lb.	.85	.90	.90	.85
.30	.25	.31	.29	Orthotoluidine, 350 lb bbl 1c-1 lb.	.25	30	.30	.25

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er markets and it is expected that special emphasis will be directed towards those channels held by denatured ethyl alcohol. It is reported that plans are being made for a special drive next season on the anti-freeze market. By that time, it is estimated that there will be a surplus of from five to six million gallons of methanol to be distributed at the expense of ethyl alcohol. This is based on an estimated production of ten million gallons synthetically, and three million gallons by wood distillation. Normal estimated consumption is about seven million gallons, which leaves about six million gallons to find new outlets. The most obvious field for the disposal of this material is in the anti-freeze market and it is reported that considerable sales and advertising effort will be directed towards this end. Production of crude methanol in February totaled 615,032 gallons, comparing with 715,886 gallons in January and 685,567 gallons in February, 1929. Production of refined totaled 394,647 gallons against 248,723 gallons in January and 449,800 gallons in February, 1929. Stocks of refined at the end of February were 705,258 as compared with 695,155 gallons on hand at the end of January and 550,702 gallons of record February 28, 1929.

Nitrogenous Material — Stocks of this material have been accumulating and this factor, coupled with a lack of demand, has resulted in lower prices during the past month. Quotations are now at $3.25 per unit.

Rosin — The general level of prices is below that last quoted, although present prices indicate a recovery from lower ones reached earlier in the month.

Shellac — Heavy stocks in Calcutta and continued lack of demand have resulted in even lower prices during the past month. The market has been very easy and quotations are at 36c lb. for bone dry; 31c lb. for garnet; 31c lb. for superfine; and 28c lb. for TN. Although stocks here are reported as being moderate, buyers evidently feel that reports of an unusually large Bysacki crop are true, for there is a general apathy concerning purchases. At any rate, prices are now lower than they have been for some years and from all indications they will not recover to any great extent within the near future.

Soda Ash — Continues to move in good quantity, with the level of shipments but

1929 High	1929 Low	1928 High	1928 Low		Current Market	1930 High	1930 Low
				Orthonitroparachlorphenol, tins ....lb.	.70	.75	.75	.70
.75	.70	.75	.70	Osage Orange, crystals.....lb.	.16	.17	.17	.16
.17	.16	.17	.16	51 deg. liquid.....lb.	.07	.07½	.07½	.07
.07½	.07	.07	.07	Powdered, 100 lb bags.....lb.	.14½	.15	.15	.14½
.15	.14½	.15	.14½	Paraffin, refd, 200 lb cs slabs				
.06½	.04½	.06½	.06½	123-127 deg. M. P.....lb.	.04½	.04½	.04½	.04½
.07	.04½	.07½	.07½	128-132 deg. M. P.....lb.	.04½	.06½	.06½	.04½
.07½	.06½	.08½	.08	133-137 deg. M. P.....lb	.06½	.07½	.07½	.06½
.28	.20½	.28	.20½	Para Aldehyde, 110-55 gal drs..lb.	.20½	.23	.23	.20½
1.05	1.00	1.05	1.00	Aminoacetanilid, 100 lb bg..lb.	1.00	1.05	1.05	1.00
				Aminohydrochloride, 100 lb kegs.....lb	1.25	1.30	1.30	1.25
1.30	1.25	1.30	1.25	Aminophenol, 100 lb keg...lb.	.99	1.02	1.02	.99
1.15	.99	1.15	1.15	Chlorophenol, drums.....lb.	.50	.65	.65	.50
.65	.50	.65	.50	Coumarone, 330 lb drums. lb.	.....	.....	.....	.....
.....	.....	.....	.....	Cymene, refd, 110 gal dr. .gal.	2.25	2.50	2.50	2.25
2.50	2.25	2.50	2.25	Dichlorobenzene, 150 lb bbls wks.....lb.	.17	.20	.20	.17
.20	.17	.20	.17	Nitroacetanilid, 300 lb bbls.lb.	.50	.55	.55	.50
.55	.50	.55	.50	Nitroaniline, 300 lb bbls wks .....lb.	.48	.55	.55	.48
.55	.48	.59	.48	Nitrochlorobenzene, 1200 lb drs wks.....lb.	.23	.26	.26	.23
.26	.23	.32	.32	Nitro-orthotoluidine, 300 lb bbls.....lb.	2.75	2.85	2.85	2.75
2.85	2.75	2.85	2.75	Nitrophenol 185 lb bbls....lb.	.45	.50	.50	.45
.55	.45	.55	.50	Nitrosodimethylaniline, 120 lb. bbls.....lb.	.92	.94	.94	.92
.94	.92	.94	.92	Nitrotoluene, 350 lb bbls....lb.	.29	.31	.31	.29
.31	.29	.30	.30	Phenylenediamine, 350 lb bbls .....lb.	1.15	1.20	1.20	1.15
1.20	1.15	1.20	1.15	Toueneulfonamide, 175 lb bbls.....lb.	.70	.75	75	.70
.75	.70	.41	.40	Toluenesulfonchloride, 410 lb bbls wks.....lb.	.20	.22	.22	.20
.22	.20	.22	.20	Toluidine, 350 lb bbls wk...lb.	.38	.40	.40	.38
.42	.38	.42	.40	Paris Green, Arsenic Basis				
.27	.25	.25	.20	100 lb kegs.....lb.	.....	.27	.27	.27
.25	.23	.23	.17	250 lb kegs.....lb.	.....	.25	.25	.25
.25	.25	.....	.....	Persian Berry Ext., bbls.....lb.	.25	Nom.	Nom.	.25
				Pentasol (see Alcohol, Amyl)...				
				Pentasol Acetate (see Amyl Acetate)				
.02½	.02	.03	.02½	Petrolatum, Green, 300 lb bbl.lb.	.02	.02½	.02½	.02
.16	.13	.13	.20	Phenol, 250-100 lb drums.....lb.	.14½	.15	.15	.14½
1.35	1.35	1.35	1.3(	Phenyl - Alpha - Naphthylamine, 100 lb kegs.....lb.	.....	1.35	1.35	1.35
				Phenylhydrazine Hydrochloride .....lb.	2.90	3.00	3.00	2.90
				Phosphate				
				Phosphate Acid (see Superphosphate)				
				Phosphate Rock, f.o.b. mines				
3.15	3.00	3.15	3.00	Florida Pebble, 68% basis..ton	3.00	3.15	3.15	3.00
4.00	3.50	3.65	3.50	70% basis.....ton	3.75	4.00	4.00	3.75
4.50	4.00	4.15	4.00	72% basis.....ton	4.25	4.50	4.50	4.25
5.50	5.00	5.00	5.00	75-74% basis.....ton	5.25	5.50	5.50	5.25
5.75	5.75	5.75	5.75	75% basis.....ton	.....	5.75	5.75	5.75
6.25	6.25	6.25	6.25	77-76% basis.....ton	.....	6.25	6.25	6.25
5.00	5.00	5.00	5.00	Tennessee, 72% basis.....ton	.....	5.00	5.00	5.00
				Phosphorous Oxychloride 175 lb cyl.....lb.	.20	.25	.25	.20
.40	.20	.40	.35	Red, 110 lb cases.....lb.	.37½	.42	.42	.37½
.60	.37½	.65	.60	Yellow, 110 lb cases wks..lb.	.31	.37½	.37½	.31
.32	.31	.32	.32	Sesquisulfide, 100 lb cs.....lb.	.....	.44	.44	.44
.46	.44	.46	.46	Trichloride, cylinders.....lb.	.20	.25	.25	.20
.35	.20	.....	.....	Phthalic Anhydride, 100 lb bbls wks.....lb.	.16	.18	.20	.16
.20	.18	.20	.18	Pigments Metallic, Red or brown				
45.00	37.00	45.00	37.00	bags, bbls, Pa. wks.....ton	37.00	45.00	45.00	37.00
				Pine Oil, 55 gal drums or bbls				
.64	.63	.64	.63	Destructive dist.....lb.	.63	.64	.64	.63
10.60	8.00	10.60	8.00	Prime bbls.....bbl.	8.00	10.60	10.60	8.00
.70	.65	.70	.70	Steam dist. bbls.....gal.	.65	.70	.70	.65
				Pitch Hardwood,.....				
45.00	40.00	45.00	40.00	wks.....ton	40.00	45.00	45.00	40.00
				Plaster Paris, tech, 250 lb bbls .....bbl.	3.30	3.50	3.50	3.30
3.50	3.30	3.30	3.30					
				Potash				
.07½	.06½	.07½	.07½	Potash, Caustic, wks, solid...lb.	.06½	.06½	.06½	.06½
.07½	.0705	.07½	.07½	flake .....lb.	.0705	08	.08	.0705
				Potash Salts, Rough Kainit				
9.10	9.00	9.00	9.00	12.4% basis bulk.....ton	.....	9.20	9.20	9.10
9.60	9.50	9.50	9.50	14% basis.....ton	.....	9.70	9.70	9.60
				Manure Salts.....				
12.50	12.40	12.40	12.40	20% basis bulk.....ton	.....	12.65	12.65	12.50
18.95	18.75	18.75	18.75	30% basis bulk.....ton	.....	19.15	19.15	18.95
				Potassium Acetate.....lb.	.27	.30	.30	.27
36.75	36.40	36.40	36.40	Potassium Muriate, 80% basis bags.....ton	.....	37.15	37.15	36.75
27.50	27.00	27.00	27.00	Pot. & Mag. Sulfate, 48% basis bags.....ton	.....	27.80	27.80	27.50
47.75	47.30	47.30	47.30	Potassium Sulfate, 90% basis bags.....ton	.....	48.25	48.25	47.75
.14	.09½	.09½	.09	Potassium Bicarbonate, USP, 320 lb bbls.....lb.	.09½	.10	.10	.09½
.09½	.09	.09½	.08½	Bichromate Crystals, 725 lb casks.....lb.	.09	.09½	.09½	.09
.13½	.13	.12½	.12	Powd., 725 lb cks wks....lb.	.13	.13½	.13½	.13

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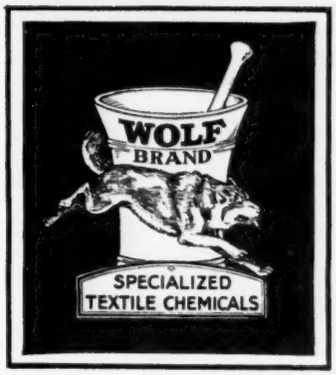

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Prices Current and Comment

Purchasing Power of the Dollar: 1926 Average—$1.00 - 1929 Average $1.039 - Jan. 1929 $1.026 - Mar. 1930 $1.102

little below that of last year. Glass and paper industries are not taking this material in normal volume, but soap and rayon continue quite an active demand.

Soda Caustic — Here again a decided improvement over conditions existing earlier in the year, has been noted. The level of shipments has been consistently good and not far from that of last year. This has been taken as a favorable indication that the general level of industrial activity is not so far from normal, since this material, going as it does into many diversified fields, furnishes a good indicator of general conditions.

Sodium Nitrate — Demand continues fairly good for this material, especially the more expensive grade. It is pointed out that the season is a very late one and that, although fertilizer tag sales are inclined to lag behind those of last year to date, the sum total will probably be as great, if not larger. From Chile, it is reported oficinas having an annual production of approximately 60,000 metric tons have agreed to shut down by the end of March, under a plan submitted by the association. This is to further the scheme to reduce the excessive World stocks, which are over 500,000 tons more than last year this date. According to reports from Chile, shipments during February were as follows: 86,000 tons shipped to United States Atlantic; 74,000 tons shipped to Europe; 6,000 tons shipped to various countries; 2,500 tons shipped to United States Pacific. The production during February amounted to 230,189 tons, against 251,427, in February 1929. The 66 oficinas in operation in Chile during January, 1930, produced 280,000 metric tons of sodium nitrate compared with 275,000 during the same month in the previous year. Exports amounted to 235,000 tons against 440,000 for January, 1929. World stocks at the end of January, 1930, totaled 2,730,000 tons compared with 2,200,000 tons for the same month of 1929. Sodium nitrate production in Chile for the calendar year 1929 was the highest in the history of the industry, amounting to 3,237,594 metric tons and exceeding the record figures of 1928 by 62,770 tons. Exports amounted to 2,841,900 metric tons, compared with 2,132,900 tons for 1928. As world consumption of Chilean nitrate in 1929 amounted to only 2,677,200 tons (2,525,700 tons during 1928) stocks were appreci-

1929 High	1929 Low	1928 High	1928 Low		Current Market	1930 High	1930 Low
.17	.14	.17	.16	Binoxiate, 300 lb bbls.....lb.	.14	.17	.17	.14
.30	.30	.30	.30	Bisulfate, 100 lb kegs.....lb.	.....	.30	.30	.30
.05½	.05½	.05½	.05½	Carbonate, 80-85% calc. 800 lb casks.....lb.	.05½	.05½	.05½	.05½
.09	.08½	.09	.06½	Chlorate crystals, powder 112 lb keg wks.....lb.	.08½	.09	.09	.08½
.05½	.05½	.05½	.05½	Chloride, crys bbls.....lb.	.05½	.06	.06	.05½
.28	.23	.28	.27	Chromate, kegs.....lb.	.23	.28	.28	.23
.57½	.55	.57½	.55	Cyanide, 110 lb. cases.....lb.	.55	.57½	.57½	.55
.13	.11½	.12	.11½	Metabisulfite, 300 lb. bbl...lb.	.12	.13	.13	.12
.24	.16	.17	.16	Oxalate, bbls.....lb.	.20	.24	.24	.20
.12	.11	.12	.11	Perchlorate, casks wks.....lb.	.11	.12	.12	.11
.16½	.16	.15½	.15	Permanganate, USP, crys 500 & 100 lb drs wks.....lb.	.16	.16½	.16½	.16
.40	.38	.38	.37	Prussiate, red, 112 lb keg...lb.	.38	.40	.40	.38
.21	.18½	.18½	.18	Yellow, 500 lb casks.....lb.	.18½	.21	.21	.18½
.51	.51	.51	.51	Tartrate Neut, 100 lb keg..lb.	.....	.21	.21	.21
.25	.21	.25	.25	Titanium Oxalate, 200 lb bbls .....lb.	.21	.23	.23	.21
5.00	5.00	..	....	Propyl Furoate, 1 lb tins.....lb.	.....	5.00	5.00	5.00
.05	.04	.05	.04	Pumice Stone, lump bags.....lb.	.04	.05	.05	.04
.06	.04½	.06	.04½	250 lb bbls.....lb.	.04½	.06	.06	.04½
.03	.02½	.03	.02½	Powdered, 350 lb bags.....lb.	.02½	.03	.03	.02½
.03½	.03½	.03½	.03½	Putty, commercial, tubs..100 lb.	.....	.03½	.03½	.03½
.05½	.05½	.05½	.05½	Linseed Oil, kegs.....100 lb.	.....	.05½	.05½	.05½
1.75	1.50	1.50	1.50	Pyridine, 50 gal drums.....gal.	.....	1.75	1.75	1.75
.13½	.13	.13	.13	Pyrites, Spanish cif Atlantic ports bulk.....unit	.13	13½	.13½	.13
.04	.03	.04	.03	Quebracho, 35% liquid tks....lb.	.03	.04	.04	.03
.04½	.03½	.04	.03½	450 lb bbls c-1.....lb.	.03½	.03½	.03½	.03½
.04½	.05½	.05	.04	35% Bleaching, 450 lb bbl .lb.	.04½	.05½	.04½	.05½
.05½	.05½	.05	.05	Solid, 63%, 100 lb bales cif..lb.	.05	.05½	.05½	.05
.05½	.05½	.05	.05	Clarified, 64%, bales.....lb.	.....	.05½	.05½	.05½
.06	.05½	.06	.05½	Quercitron, 51 deg liquid 450 lb bbls.....lb.	.05½	.06	.06	.05½
.13	.10	.13	.10	Solid, 100 lb boxes.....lb.	.10	.13	.13	.10
14.00	14.00	14.00	14.00	Bark, Rough.....ton	.....	14.00	14.00	14.00
35.00	34.00	35.00	34.00	Ground.....ton	34.00	35.00	35.00	34.00
.46	.44	.46	.45	R Salt, 250 lb bbls wks.....lb.	.44	.45	.45	.44
.18	.18	....	.....	Red Sanders Wood, grd bbls..lb.	.....	.18	.18	.18
1.25	1.15	1.35	1.25	Resorcinol Tech, cans.....lb.	1.15	1.25	1.25	1.15
.62	.57	.57	.57	Rosin Oil, 50 gal bbls, first run .....gal.	.57	.58	.58	.57
.64	.60	.62	.62	Second run.....gal.	.60	.61	.61	.60

Rosin

				Rosins 600 lb bbls 280 lb...unit				
9.25	7.45	9.75	8.20	B.....	.....	7.25	7.75	7.25
9.25	7.70	9.80	8.25	D.....	.....	7.50	8.00	7.50
9.27	8.30	9.95	8.60	E.....	.....	7.85	8.17	7.85
9.27	8.40	10.10	8.65	F.....	.....	7.85	8.45	8.25
9.45	8.40	10.10	8.75	G.....	.....	8.45	8.45	8.35
9.50	8.40	10.10	8.75	H.....	.....	8.45	8.55	8.40
9.50	8.40	10.15	8.80	I.....	.....	8.45	8.58	8.47
9.55	8.45	10.15	8.85	K.....	.....	8.60	8.65	8.47
9.85	8.50	10.30	8.85	M.....	.....	8.65	8.80	8.65
10.30	8.93	11.00	9.15	N.....	.....	8.85	8.95	8.85
11.30	9.00	11.65	10.15	WG.....	.....	8.85	9.25	8.85
12.30	9.30	12.65	10.40	WW.....	.....	9.10	9.85	9.10
30.00	24.00	30.00	24.00	Rotten Stone, bags mines....ton	24.00	30.00	30.00	24.00
.08	.05	.08	.07	Lump, imported, bbls.....lb.	.05	.07	.07	.05
.12	.09	.12	.09	Selected bbls.....lb.	.09	.12	.12	.09
.05	.02	.05	.02	Powdered, bbls.....lb.	.02	.05	.05	.02
.05	.04½	.05	.04½	Sago Flour, 150 lb bags.....lb.	.04½	.05	.05	.04½
1.00	1.00	.....	.....	Sal Soda, bbls wks.....100 lb.	.....	1.00	1.00	1.00
24.00	19.00	20.00	19.00	Salt Cake, 94-96% c-1 wks..ton	20.00	24.00	24.00	20.00
21.00	12.00	17.00	15.00	Chrome .....ton	20.00	21.00	21.00	20.00
.06½	.06½	.06½	.06½	Saltpetre, double refd granular 450-500 lb bbls.....lb.	.06½	.06½	.06½	.06½
.01½	.01½	.01½	.01½	Satin, White, 500 lb bbls.....lb	.....	.01½	.01½	.01½
.61	.47	.62½	.49	Shellac Bone dry bbls.....lb.	.....	.36	.47	.36
.45	.40	.55	.45	Garnet, bags.....lb.	.. ..	.31	.40	.31
.47	.39	.58	.47	Superfine, bags.....lb.	.....	.31	.39	.31
.44	.36	.55	.42	T. N. bags.....lb.	.....	.28	.34	.28
.57	.53	.57	.53	Schaeffer's Salt, kegs.....lb.	.53	.57	.57	.53
11.00	8.00	11.00	8.00	Silica, Crude, bulk mines....ton	8.00	11.00	11.00	8.00
30.00	22.00	30.00	22.00	Refined, floated bags.....ton	22.00	30.00	30.00	22.00
32.00	32.00	.....	.....	Air floated bags.....ton	.....	32.00	32.00	32.00
40.00	32.00	40.00	32.00	Extra floated bags.....ton	32.00	40.00	40.00	32.00
22.00	15.00	22.00	15.00	Soapstone, Powdered, bags f. o. b. mines.....ton	15.00	22.00	22.00	15.00

Soda

				Soda Ash, 58% dense, bags c-1 wks.....100 lb.	.....	1.40	1.40	1.40
1.40	1.40	1.40	1.40					
1.34½	1.34½	2.29	2.40	58% light, bags.....100 lb.	.....	1.34½	1.34½	1.34½
1.32	1.32	1.32½	1.32½	Contract, bags c-1 wks.100 lb.	.....	1.32	1.32	1.32
3.35	3.35	4.21	4.16	Soda Caustic, 76% grnd & flake drums.....100 lb.	.....	3.35	3.35	3.35
2.95	2.95	3.91	3.76	76% solid drs.....100 lb.	.....	2.95	2.95	2.95
2.90	2.90	3.00	3.00	Contract, c-1 wks.....100 lb.	.....	2.90	2.90	2.90
.06½	.04½	.05	.04½	Sodium Acetate, tech....450 lb. bbls wks.....lb.	.04	.05½	.05½	.04
.19	.18	.....	.....	Arsenate, drums.....lb.	.18	.19	.19	.18
1.50	.75	.....	.....	Arsenite, drums.....gal.	.75	1.00	1.00	.75
2.41	2.41	2.41	2.41	Bicarb, 400 lb bbl NY..100 lb.	.....	2.41	2.41	2.41

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Prices Current and Comment

Purchasing Power of the Dollar: 1926 Average—$1.00 - 1929 Average $1.039 - Jan. 1929 $1.026 - Mar. 1930 $1.102

ably higher than the previous year, amounting to 2,621,800 tons which is a very high figure.

Sodium Phosphate — Demand for the di-salt were reported to be in about normal volume from the various branches of the textile industry. Rayon, however, is tending slightly off, while silk is also somewhat behind normal.

Sodium Sulfide — Domestic material continues very strong and it is reported that a firmer situation is developing in the foreign markets.

Sulfur — A tax of 55c per ton on Texas sulfur production becomes operative as of April 1, but is not expected to influence the prices, either at the mines or on spot material, since there had previously existed a tax of 2 per cent on the crude. The new tax represents, however, some increase in duty as well as a change in the method of imposing the tax to a flat price basis.

Superphosphate — Production of bulk superphosphate, as reported to the Department of Commerce by eighty concerns operating 170 plants during January, amounted to 476,130 tons. This compares with 379,347 tons produced in December and with 408,544 tons reported in January last year. Shipments to consumers during January totaled 76,184 tons, against 33,338 tons in December and 44,372 tons in January, 1929. Stocks at the close of January were 1,836,672 tons, against 1,313,828 and 1,550,861 tons.

Turpentine — Although prices have been lower during the past month due to heavy stocks, they have now returned to about the same level as when last quoted. Spirits are at 55½ @ 61½c gal., while wood distilled is at 52c gal.

Valonia — Some scarcity of spot material has resulted in higher quotations so that beard is at $40 per ton and cups at $27 per ton.

OILS AND FATS

Chinawood Oil — Prices have varied but little during the past month and in the main the market has been steady. Business still continues to be of the hand-to-mouth variety since there has as yet been no concerted demand from the paint and varnish trades. Coast tanks are at 10c lb., tanks at New York at 10¾c lb., and barrels, New York, at 12½c lb.

1929 High	1929 Low	1928 High	1928 Low		Current Market		1930 High	1930 Low
.07½	.07	.07	.06½	Bichromate, 500 lb cks wks. lb.	.07	.07½	.07½	.07
.04	.04	.04	.04	Bisulfite, 500 lb bbl wks. . . . lb.	.....	.04	.04	.04
1.35	1.30	1.35	1.30	Carb. 350 lb bbls NY. . 100 lb.	1.30	1.35	1.35	1.30
.11	.06½	.06¼	.05¾	Chlorate, ... wks. . lb.	.07½	.08	.08	.07½
13.00	12.00	13.00	12.00	Chloride, technical. . . . . ton	12.00	13.00	13.00	12.00
.20	.18	.20	.20	Cyanide, 96-98%, 100 & 250 lb drums wks. . . . . lb.	.18	.20	.20	.18
.09	.08½	.09	.08¾	Fluoride, 300 lb bbls wks. . . lb.	.08½	.09	.09	.08½
.24	.22	.24	.22	Hydrosulfite, 200 lb bbls f. o. b. wks. . . . . lb.	.22	.24	.24	.22
.05	.05	.05	.05	Hypochloride solution, 100 lb cbys. . . . . lb.	.....	.05	.05	.05
3.05	2.50	3.05	2.65	Hyposulfite, tech, pea cyrs 375 lb bbls wks. . . . . 100 lb.	2.50	3.00	3.00	2.50
2.65	2.40	2.65	2.40	Technical, regular crystals 375 lb bbls wks. . . . 100 lb.	2.40	2.65	2.65	2.40
.45	.45	.45	.45	Metanilate, 150 lb bbls. . . . lb.	.....	.45	.45	.45
.02½	.02½	.....	.....	Monohydrate, bbls. . . . . lb.	.....	.02½	.02½	.02½
.57	.54	57	.55	Naphthionate, 300 lb bbl. . . lb.	.54	.57	.57	.54
2.22½	2.09	2.45	2.12½	Nitrate, 92%, crude, 200 lb bags c-1 NY. . . . . 100 lb.	2.16	2.22½	2.22½	2.16
.08	.07½	.08½	.07½	Nitrite, 500 lb bbls spot. . . lb.	.07½	.08	.08	.07½
.27	.25	.27	.25	Orthochlorotoluene, sulfonate, 175 lb bbls wks. . . . . lb.	.25	.27	.27	.25
.42	.37	.23	.20	Oxalate Neut, 100 lb kegs. . lb.	.37	.42	.42	.37
.22	.18	.22	.21	Perborate, 275 lb bbls. . . . . lb.	.18	.20	.20	.18
3.55	3.25	3.55	3.25	Phosphate, di-sodium, tech. 310 lb bbls. . . . . 100 lb.	3.00	3.25	3.25	3.00
4.00	3.90	.....	.....	tri-sodium, tech, 325 lb bbls. . . . . 100 lb.	3.60	4.00	4.00	3.60
.72	.69	.72	.69	Picramate, 100 lb kegs. . . . . lb.	.69	.72	.72	.69
.12½	.12	.12½	.12	Prussiate, Yellow, 350 lb bbl wks. . . . . lb.	.12	.12½	12½	.12
.20	.15	.14	.13½	Pyrophosphate, 100 lb keg. . lb.	.15	.20	.20	.15
1.65	1.65	1.45	1.20	Silicate, 60 deg 55 gal drs, wks . . . . . 100 lb.	.....	1.65	1.65	1.65
.80	.70	1.10	.85	40 deg 55 gal drs, wks . . . . . 100 lb.	.70	.80	.80	.70
.05½	.05	.05	.05	Silicofluoride, 450 lb bbls NY . . . . . lb.	.05½	.05½	.05½	.05½
.43	.38	.49	.48½	Stannate, 100 lb drums. . . . lb.	.....	.38	.43	.38
.29	.25	.29	.18	Stearate, bbls. . . . . lb.	.25	29	.29	.25
.18	.16	.18	.16	Sulfanilate, 400 lb bbls. . . . . lb.	.16	.18	.18	.16
.02½	.02½	.02¾	.02½	Sulfate Anhyd, 550 lb bbls c-1 wks. . . . . lb.	.02½	.02¾	.02¾	.02½
.02¾	.02½	02¾	.02½	Sulfide, 80% crystals, 440 lb bbls wks. . . . . lb.	.02½	.02¾	.02¾	.02½
.04	.03½	.04	.03½	62% solid, 650 lb drums 1c-1 wks. . . . . lb	.03	03¼	.03¼	.03
.03½	.03	.03½	.03¼	Sulfite, crystals, 400 lb bbls wks. . . . . lb.	.03	.03¼	.03¼	.03
.76	.28½	.50	.40	Sulfocyanide, bbls. . . . . lb.	.28	.35	.35	.28
1.40	.88	.85	.80	Tungstate, tech, crystals, kegs . . . . . lb.	.....	.88	.88	.88
.40	.35	.40	.35	Solvent Naphtha, 110 gal drs wks. . . . . gal.	.35	40	.40	.35
.01½	.01½	.01½	.01½	Spruce, 25% liquid, bbls. . . . . lb.	.....	.01½	.01½	.01½
.01	.01	.01	.01	25% liquid, tanks wks. . . . . lb.	.....	.01	.01	.01
.02¼	.02	.02¼	.02	50% powd, 100 lb bag wks lb.	.02	.02¼	.02¼	.02
4.12	3.82	4.42	3.07	Starch, powd., 140 lb bags . . . . . 100 lb.	3.72	4.02	4.02	3.72
4.02	3.72	4.32	2.97	Pearl, 140 lb bags. . . . . 100 lb.	3.62	3.82	3.92	3.62
.06½	.05½	.06½	.05½	Potato, 200 lb bags. . . . . lb.	.05½	.06¼	.06¼	.05½
.06½	.05½	.06½	.05¾	Imported bags. . . . . lb.	.05½	.06¼	.06¼	.05¾
.08½	08	.08½	.08	Soluble. . . . . lb.	.08	.08½	.08½	.08
.10	.09½	.10	.09½	Rice, 200 lb bbls. . . . . lb.	.09½	.10	.10	.09½
.07	.06½	.07	.06½	Wheat, thick bags. . . . . lb.	.06½	.07	.07	.06½
.10	.09½	.10	.09½	Thin bags. . . . . lb.	.09½	10	.10	.09½
.07½	.07½	.07½	.07½	Strontium carbonate, 600 lb bbls wks. . . . . lb.	.07½	.07½	.07½	.07½
.09½	.08½	.09	.08¾	Nitrate, 600 lb bbls NY. . . . lb.	.09	.09½	.09½	.09
1.25	1.25	.....	.....	Peroxide, 100 lb drs. . . . . lb.	.....	1.25	1.25	1.25
				Sulfur				
2.05	2.05	2.05	2.05	Sulfur Brimstone, broken rock, 250 lb bag c-1. . . . . 100 lb.	.....	2.05	2.05	2.05
19.00	18.00	19.00	18.00	Crude, f. o. b. mines. . . . . ton	18.00	19.00	19.00	18.00
2.40	2.40	2.40	2.40	Flour for dusting 99½%, 100 lb bags c-1 NY. . . . 100 lb.	.....	2.40	2.40	2.40
2.50	2.50	2.50	2.50	Heavy bags c-1. . . . . 100 lb.	.....	2.50	2.50	2.50
3.45	3.45	3.45	3.45	Flowers, 100%, 155 lb bbls c-1 NY. . . . . 100 lb.	.....	3.45	3.45	3.45
2.85	2.65	2.85	2.65	Roll, bbls 1c-1 NY. . . . . 100 lb.	2.65	2.85	2.85	2.65
.05½	.05	.05½	.05	Sulfur Chloride, red, 700 lb drs wks. . . . . lb.	.05	.05½	.05½	.05
.04½	.03½	.04½	.03½	Yellow, 700 lb drs wks. . . . lb.	.03½	.04½	.04½	.03½
.08½	.07	.08½	.08	Sulfur Dioxide, 150 lb cyl. . . lb.	.07	.07½	.07½	.07
.19	.10	.19	.17	Extra, dry, 100 lb cyl. . . . . lb.	.10	.12	.12	.10
.65	10	.65	.10	Sulfuryl Chloride, 600 lb dr. . lb.	.10	.65	.65	.10
15.00	12.00	15.00	12.00	Talc, Crude, 100 lb bgs NY. . . ton	12.00	15.00	15.00	12.00
18.00	16.00	18.00	16.00	Refined, 100 lb bgs NY. . ton	16.00	18.00	18.00	16.00
25.00	18.00	35.00	30.00	French, 220 lb bags NY. . . ton	18.00	22.00	22.00	18.00
45.00	35.00	45.00	38.00	Refined, white, bags. . . . ton	35.00	40.00	40.00	35.00
50.00	40.00	50.00	40.00	Italian, 220 lb bags NY. . . ton	40.00	50.00	50.00	40.00
55.00	50.00	55.00	50.00	Refined, white, bags. . . . ton	50.00	55.00	55.00	50.00
10.00	9.00			Superphosphate, 16% bulk, wks. . . . . ton	.....	9.50	9.50	9.50
4.50&10	4.00&10	5.10&10	4.65&10	Tankage Ground NY. . . . . unit	.....	4.00&10	4.00&10	4.00&10
4.80&10	3.75&10	4.80&10	3.90&10	High grade f.o.b. Chicago. unit	.....	3.75&10	3.75&10	3.75&10
4.80&10	4.35&10	5.00&10	4.60&10	South American cif. . . . . unit	.....	4.00&10	4.25&10	4.00&10
.05½	.04½	.05	.04½	Tapioca Flour, high grade bgs. lb.	.05½	.05¾	.05¾	.05½
.04½	.03½	.04	.03¾	Medium grade, bags. . . . . lb.	.04½	.04¾	.04¾	.04½
.27	.26	.27	.26	Tar Acid Oil, 15%, drums. . . . gal.	.26	.27	.27	.26
.30	.29	.30	.29	25% drums. . . . . gal.	.29	.30	.30	.29

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Prices Current and Comment

Purchasing Power of the Dollar: 1926 Average—$1.00 - 1929 Average $1.039 - Jan. 1929 $1.026 - Mar. 1930 $1.102

Coconut Oil — Has been in rather easy position during most of the past month. There has been some inquiry at times, but in the main, consumers have shown no desire to engage in any concerted buying. Competition among sellers has also been keen despite the fact that offerings have not been very heavy. Prices have declined about ¼c lb. on all grades during the month, and some shading below these prices has been reported.

Corn Oil — Prices have declined during the past month and the market has been rather easy. Offerings have been light but there has been a noticeable absence of demand. Quotations are about ¼c lb. lower than when last reported being on the basis of 7¾c lb. for crude in tanks at the mills, and 9½c lb. in barrels at New York. Refined oil is at 8¾c lb. in tanks and 10c lb. in barrels.

Cottonseed Oil — The market is generally characterized as having been steady but dull during the past month. Spot prices differ but slightly from those quoted a month ago while futures are somewhat lower.

Lard Oil — Demand has been rather slow during the past month and prices have declined accordingly. There has been but little demand and that has been for small quantity business. Prime is now at 13c lb., extra at 11½c lb., and extra No. 1 at 10½c lb.

Linseed Oil — Sales of this material have been rather quiet during the past month since there has been but little active demand from the paint and varnish trades. During the middle of the month, when somewhat lower prices prevailed, some business was done, but in general the month has been quiet. Commercial stocks of flaxseed in the United States and Canada on March 1 were 347,000 bushels below stocks at the same time last year and 4,110,000 bushels below those of 1928. Stocks in commercial centers reporting to the United States government were 740,000 bushels compared with 780,000 bushels in 1929 and 2,816,000 bushels in 1928. Stocks in store in the Western Grain Inspection Division of Canada were 1,006,000 bushels compared with 1,313,000 bushels in 1929 and 3,040,000 bushels in 1928. Shipments of flax from the Argentine are reported to be declining as might be expected with the reported short crop. It is estimated that this year's exportable surplus is about 45,000,000 bushels, of which amount over 18,000,000 bushels

1929 High	1929 Low	1928 High	1928 Low		Current Market	1930 High	1930 Low
				Terra Alba Amer. No. 1, bgs or			
1.75	1.15	1.75	1.15	bbls mills.....100lb.	1.15	1.75	1.15
2.00	1.50½	2.00	1.50	No. 2 bags or bbls...100lb.	1.50	2.00	1.50
.02½	.01	.02½	.02	Imported bags.....lb.	.01½	.01½	.01½
.09½	.09	.....	.....	Tetrachlorethane, 50 gal dr...lb.	.09	.09½	.09½
.20	.20	.20	.20	Tetralene, 50 gal drs wks.....lb.	.....	.20	.20
.24	.22	.24	.22	Thiocarbanilid, 170 lb bbl....lb.	.22	.24	.24
				Tin Bichloride, 50% soln, 100 lb			
.14½	.13½	.17½	.14½	bbls wks.....lb.	.....	.12½	.12½
.38	.33	.41½	.36½	Crystals, 500 lb bbls wks...lb.	.31	.31½	.34
.48	.39	.58	.48	Metal Straits NY.....lb.	.....	.38	.38
.56	.42	.75	53	Oxide, 300 lb bbls wks.....lb.	.....	.40	.42
				Tetrachloride, 100 lb drs wks.			
.30½	.27½	.35½	.30½	.....lb.	.....	.25½	.25½
.50	.22	.40	.40	Titanium Dioxide 300 lb bbl..lb	.22	.....	.50
.14	.07½	.14	.13½	Pigment, bbls.....lb.	.07½	.07½	.07½
.45	.45	.45	.40	Toluene, 110 gal drs.....gal.	.....	.40	.40
.40	.40	.45	.35	8000 gal tank cars wks....gal.	.....	.35	.35
.94	.90	.94	.90	Toluidine, 350 lb bbls.....lb.	.90	.94	.94
.32	.31	.32	.31	Mixed, 900 lb drs wks.....lb.	.31	.32	.32
.95	.85	.90	.85	Toner Lithol, red, bbls.....lb.	.90	.95	.95
.80	.70	.80	.70	Para, red, bbls.....lb.	.....	.80	.80
1.55	1.50	1.80	1.70	Toluidine .....lb.	1.50	1.55	1.55
.36	.32	3.90	3.60	Triacetin, 50 gal drs wks.....lb.	.32	.36	.36
.10½	.10	.....	.....	Trichlorethylene, 50 gal dr...lb.	.10	.10½	.10½
.60	.55	.....	.....	Triethanolamine, 50 gal drs...lb.	.40	.42	.42
.45	.33	.50	.36	Tricresyl Phosphate, drs.....lb.	.33	.45	.45
.70	.58	.73	.69	Triphenyl guanidine.....lb.	.58	.60	.60
.75	.60	.75	.70	Phosphate, drums.....lb.	.60	.70	.70
2.00	1.75	3.00	2.50	Tripoli, 500 lb bbls.....100 lb.	1.75	2.00	2.00
.65	.51½	.66½	.50½	Turpentine Spirits, bbls.....gal.	.55	.61½	.61½
.57	.49	.59	.46	Wood Steam dist. bbls....gal.	.....	.52	.52
.30	.15	.20	.18	Urea, pure, 112 lb cases.....lb	.15	.17	.17
105.00	98.00			Fert. grade, bags c.i.f.....ton	.....	108.00	108.00
106.30	99.30			c. i. f. S. points.....ton	.....	109.30	109.30
				Valonia Beard, 42%, tannin			
55.00	42.00	76.00	55.00	bags.....ton	.....	40.00	40.00
35.00	30.00	55.00	58.00	Cups, 30-31% tannin.....ton	.....	27.00	27.00
43.00	35.00	64.00	45.00	Mixture, bark, bags.....ton	.....	32.00	32.50
2.05	2.00	2.10	1.75	Vermillion, English, kegs....lb..	2.00	2.05	2.05
1.00	1.00	.....	.....	Vinyl Chloride, 16 lb cyl.....lb.	.....	1.00	1.00
49.75	43.50	76.00	49.75	Wattle Bark, bags.....ton	.....	44.00	47.75
				Extract 55%, double bags ex-			
.06½	.06½	.06½	.05½	dock.....lb.	.....	.06½	.06½
				Whiting, 200 lb bags, c-1 wks			
1.25	1.00	1.25	1.25	.....100 lb.	.....	1.00	1.00
13.00	13.00	13.00	13.00	Alba, bags c-1 NY.....ton	.....	13.00	13.00
1.35	1.35	1.35	1.35	Gilders, bags c-1 NY...100 lb.	.....	1.35	1.35
.33	.33	.32	.32	Xylene, 10 deg tanks wks. .gal.	.....	.31	.31
.32	.30	.32	.30	Commercial, tanks wks...gal.	.28	.33	.33
.38	.38	.38	.38	Xylidine, crude.....lb.	.....	.38	.38

Zinc

				Zinc Ammonium Chloride powd.,			
5.75	5.25	.05½	5.85	400 lb bbls.....100 lb.	5.25	5.75	5.75
.11	.10½	.10	.09½	Carbonate Tech, bbls NY..lb.	.10½	.11	.11
				Chloride Fused, 600 lb drs.			
.06	.05½	.06	.06	wks.....lb.	.05½	.06	.06
.06½	.06½	.06½	.06½	Gran., 500 lb bbls wks.....lb.	.06½	.06½	.06½
3.00	3.00	3.00	3.00	Soln 50%, tanks wks...100 lb.	.....	3.00	3.00
.41	.40	.41	.40	Cyanide, 100 lb drums.....lb.	.40	.41	.41
1.00	1.00			Dithiofuroate, 100 lb dr....lb.	.....	1.00	1.00
.08½	.08½	.09	.09	Dust, 500 lb bbls c-1 wks...lb.	.09½	.11	.11
				Metal, high grade slabs c-1			
6.45	6.45½	6.40	6.07½	NY.....100 lb.	.....	6.45	6.45
.07½	.07	.07½	.07½	Oxide, American bags wks..lb.	.07½	.07½	.07½
.11½	.09½	.12½	.10½	French, 300 lb bbls wks...lb.	.09½	.11½	.11½
1.25	1.25	.....	.....	Perborate, 100 lb drs.....lb.	.....	1.25	1.25
1.25	1.25	.....	.....	Peroxide, 100 lb drs.....lb.	.....	1.25	1.25
.26	.25	.....	.....	Stearate, 50 lb bbls.....lb.	.25	.26	.26
.03½	.03	.03½	.03½	Sulfate, 400 bbl wks.....lb.	.03	.03½	.03½
.32	.30	.32	.30	Sulfide, 500 lb bbls.....lb.	.30	.32	.32
.30	.28	.30	.29	Sulfocarbolate, 100 lb keg..lb.	.28	.30	.30
.03	.02½	.03	.02½	Zirconium Oxide, Nat. kegs...lb.	.02½	.03	.03
.50	.45	.50	.45	Pure kegs.....lb.	.45	.50	.50
.10	.08	.10	.08	Semi-refined kegs.....lb.	.08	.10	.10

Oils and Fats

.13½	.13	.14½	.13	Castor, No. 1, 400 lb bbls.....lb.	.13	.13½	.13½
.13	.12½	.14	.12½	No. 3, 400 lb bbls.....lb.	.12½	.13	.13
.15	.14	.17	.14	Blown, 400 lb bbls.....lb.	.14	.15	.15
.16	.14½	.17	.14½	China Wood, bbls spot NY...lb.	.....	.12½	.13
.15	.13½	.14½	.14½	Tanks, spot NY.....lb.	....	.10¾	.11⅜
.14½	.12½	.14½	.12½	Coast, tanks, April.....lb.	.....	.10	.10⅞
.10½	.10½	.11½	.10½	Cocoanut, edible, bbls NY....lb.	.....	.10½	.10½
.09½	.07½	.10	.09½	Ceylon, 375 lb bbls NY....lb.	.....	.08	.08½
.08½	.06½	.09	.08½	8000 gal tanks NY.....lb.	.06½	.07	.07
.10	.09½	.10½	.09½	Cochin, 375 lb bbls NY....lb.	.08½	.08⅞	.09½
.09½	.08½	.09½	.08½	Tanks NY.....lb.	.....	.08⅛	.08½
.09½	.07½	.10	.08⅞	Manila, bbls NY.....lb.	.07½	.08½	.08½
.08½	.06½	.08½	.08	Tanks NY.....lb.	.06½	.07	.07½
.08	.06½	.08½	.07½	Tanks, Pacific Coast.....lb.	.06½	.06½	.07

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Prices Current and Comment

Purchasing Power of the Dollar: 1926 Average—$1.00 - 1929 Average $1.039 - Jan. 1929 $1.026 - Mar. 1930 $1.102

have already gone forward since January 1. Recent estimates place the new Indian crop at 15,500,000 bushels, which is about 750,000 larger than the average for the last four years.

Neatsfoot Oil — In common with most of the animal group, this material has been in rather poor demand during the past month and prices are considerably lower. Cold pressed is at 17¼c lb.; extra at 10¾c lb.; and pure at 12¾c lb.

Olive Oil — The market for denatured oil and foots has been quite steady during the past month and prices continue at the same level as when last quoted. The production of olive oil in Spain for the 1929-1930 season is estimated at 1,367,000,000 pounds, according to a cable received by the Bureau of Agricultural Economics from the International Institute of Agriculture. This is almost equal to the record crop of 1927-1928, when 1,467,000,000 pounds were produced and, with that exception, is the highest on record. The production in 1928-1929 was only 422,000,000 pounds.

Perilla Oil — It is expected that this material will begin to assume a higher price level, since it is reported that stocks are low and a heavier buying season is foreseen. Offerings have been scarce, and stocks in consumers' hands as well are thought to be low.

Rapeseed Oil — Prices on English have declined to a basis of 80c gal., while Japanese and blown have remained unchanged. Demand has been rather light.

Dog Fish Oil — Offerings of this material have been made quite freely at 32c gal. in tanks at the Coast. Although there has always been some production, it is reported to have been greatly increased during the past season. Demand, especially from the tanning industry, has been good.

Soy Bean Oil — Has been unusually quiet during the past month, but offerings of both domestic and foreign have been light. Prices have declined due to the lack of demand so that imported is now at 9c lb. in tanks at the Coast.

Stearine Oleo—Demand has been very quiet and the market easy. Prices are lower at 8⅞c @ 9c lb., with sales reported below these figures.

Tallow — In common with the entire animal group, demand has been very quiet during the past month, with buyers holding off for further developments. Offerings also were light so that the market has been steady although rather dull.

1929 High	1929 Low	1928 High	1928 Low		Current Market	1930 High	1930 Low
				Cod, Newfoundland, 50 gal bbls			
.64	.57½	.69	.63	.....gal.	.....	.52	.56	.52
.60	.60	.63	.60	Tanks NY.....gal.	.54	.56	.62	.54
				Cod Liver see Chemicals.....				
.05½	.042	.06½	.05½	Copra, bags.....lb.	.....	.043	.046	043
.10¼	.09½	.11	.10	Corn, crude, bbls NY.....lb.	.....	.09½	.10	.09½
.09½	.07½	.10	.08¾	Tanks, mills.....lb.	.....	.07½	.08	.07¾
.11¼	.10½	.12½	.11¼	Refined, 375 lb bbls NY...lb.	.....	.10	.10½	.10
.11	.09	.11½	.10¾	Tanks.....lb.	.....	.08¾	.09½	.08¾
.09	.08½	.09½	.07¾	Cottonseed, crude, mill.....lb.	.....	.07½	.07½	.07½
.1075	.085	10.65	.09¼	PSY 100 lb bbls spot.....lb.	.....	.086	.086	.085
.1080	.088	10.75	.09½	April—June..... .....lb.	.....	.085	.095	.085
				Degras, American, 50 gal bbls				
.05	.03½	.05	.04½	NY.....lb.	.03½	.04½	.04½	.03½
.05½	.04½	.05½	.04½	English, brown, bbls NY....lb.	04½	.05	.05	.04¼
.05¼	.05	.05¼	.05½	Light, bbls NY .....lb.	.05	.05½	.05½	.05
				Dog Fish, Coast Tanks..gal.	.....	.32	.32	.32
				Greases				
.08½	.06	.08½	.07	Greases, Brown.....lb.	.....	.06½	.06½	.06½
.08½	.06½	.08½	.07	Yellow.....lb.	.....	.07½	.07½	.07½
.11¼	.07½	.11	.09½	White, choice bbls NY.....lb.	.....	.08½	.08½	.08½
		.42½	.40	Herring, Coast, Tanks.....gal.	.....	Nom.	.....	.....
Nom.	.....	Nom.	.09½	Horse, bbls.....lb.	.09½	Nom.	Nom.	.09½
.15¾	.14¼	.16½	.15½	Lard Oil, edible, prime.....lb.	.....	.13	.13½	.13
.13½	.12	.13½	.12	Extra, bbls.....lb.	.....	.11½	.12	.11½
.13¼	.11¾	.13	.11	Extra No. 1, bbls.....lb.	.....	.10½	.11	.10½
.162	.105	10.8	10.0	Linseed, Raw, five bbl lots...lb.	.....	.146	.146	.144
.158	.101	10.4	9.6	Bbls c-l spot.....lb.	.....	.142	.142	.14
.15	.093	9.6	8.8	Tanks.....lb.	.....	.134	.134	.132
.52	.45	.48	.40	Menhaden Tanks, Baltimore.gal.	.....	.50	.50	.50
.09	.09	.09	.09	Blown, bbls NY.....lb.	.....	.09	.09	.09
.70	.70	.70	.67	Extra, bleached, bbls NY..gal.	.....	.70	.70	.70
.64	.63	.64	.63	Ligh, pressed, bbls NY....gal.	.63	.64	.64	.63
.67	.66	.67	.66	Yellow, pressed, bbls NY..gal.	.66	67	.67	.66
				Mineral Oil, white, 50 gal bbls				
.60	.40	.60	.40	.....gal.	.40	.60	.60	.40
1.00	.95	1.00	.95	Russian, gal.....gal.	.95	1.00	1.00	.95
.19	.18½	.19	.18½	Neatsfoot, CT, 20° bbls NY lb.	.....	.17½	.17¾	.17½
.13½	.12	.13½	.12	Extra, bbls NY.....lb	.. ..	.10¾	.11½	.10¾
.15½	.13½	.16½	.15½	Pure, bbls NY.....lb.	.....	.12½	.13½	.12¼
.11½	.10¾	.17¾	.11¾	Oleo, No. 1, bbls NY.....lb.	.....	.12½	.12½	.12½
.11¼	.10	.15½	.11	No. 2, bbls NY..... ..lb.	.....	.10¼	.10¼	.10¼
.10½	.09¾	.14	.10	No. 3, bbls NY.....lb.	.. ..	.10½	.10½	.10½
1.40	1.05	1.40	1.18	Olive, denatured, bbls NY...gal.	.95	1.00	1.00	.95
2.00	1.95	2.00	1.75	Edible, bbls NY.....gal.	1.95	2.00	2.00	1.95
.11½	.08½	.11	.09¾	Foots, bbls NY.....lb.	.07½	.07½	.08	.07¾
.09	.08	.09½	.08¼	Palm, Kernel, Casks.....lb.	.07¾	.07¾	.08¼	.07¾
.09	.07½	.09½	.07¾	Lagos, 1500 lb casks.....lb.	.07¾	.07½	.07¾	.07¾
.08¾	.07	.08¾	.07	Niger, Casks.....lb.	.06¾	.07	.07½	.06¾
Nom.	.....	.12½	.12	Peanut, crude, bbls NY.....lb.	.....	Nom.	Nom.	.....
.15	.14½	.17	.14½	Refined, bbls NY.....lb.	.14½	15	.15	.14½
.20	.15	.21	.13	Perilla, bbls NY.....lb.	.....	.13½	.14½	.13½
15½	.13	.15½	.10½	Tanks, Coast.....lb.	.....	.11½	.11½	.10½
1.75	1.70	1.75	1.70	Poppyseed, bbls NY.....gal.	1.70	1.75	1.75	1.70
1.04	1.04	1.06	1.01	Rapeseed, blown, bbls NY...gal.	1.00	1.00	1.00	1.00
.90	.82	.92	.83	English, drms. NY.....gal.	.....	.80	.82	.80
.88	.72	.90	.81	Japanese, drms. NY.....gal.	.....	.68	.70	.68
.11½	.10½	.10¾	.09½	Red, Distilled, bbls.....lb.	.10½	.10¾	.10¾	.10½
.10½	.09½	.09½	.08	Tanks.....lb.	.....	.09½	.09½	.09½
.44	.42	.50	.42	Salmon, Coast, 8000 gal tks..gal.	.....	Nom.	.44	.42
.51	.45	.50	.41	Sardine, Pacific Coast tks...gal.	.....	.35	.42	.35
.12	.11½	.13½	.12	Sesame, edible, yellow, dos...lb.	.11½	.12	.12	.11½
.12½	.12½	.15	.12½	White, dos.....lb.	.12½	.12½	.12½	.12½
.40	.40	.40	.40½	Sod, bbls NY.....gal..	.....	.40	.40	.40
		.....	.....	Soy Bean, crude.....				
.10½	.09	.09½	.09	Pacific Coast, tanks.....lb.	.....	.09	.09¼	.09
.10½	.08½			Domestic tanks, f.o.b. mills, ...lb.	.....	.07½	.08	.07½
.12½	.11¼	.12½	.12	Crude, bbls NY.....lb.	.....	.10½	.10¾	.10¾
.11½	.10½	.10½	.10½	Tanks NY.....lb.	.....	.09½	.09¾	.09½
.13½	.13½	.13½	.13½	Refined, bbls NY.....lb.	.13½	.13½	.13½	.13½
				Sperm, 38° CT, bleached, bbls				
.85	.84	.85	.84	NY.....gal.	.84	.85	.85	.84
.80	.79	.80	.79	45° CT, bleached, bbls NY gal.	.79	.80	.80	.79
				Stearic Acid, double pressed dist				
.18½	.15½	.18½	.11	bags.....lb.	.14½	.15	.15	.14½
				Double pressed saponified bags				
.19	.15½	.19	.11½	.....lb.	.15	.15½	.15½	.15
20½	.17½	.20½	.13½	Triple, pressed dist bags..lb	.16½	.17	.17	.16½
.12	.09½	.12½	.09½	Stearine, Oleo. bbls.....lb.	.08¾	.09	.09½	.08¾
.08¾	.07	.09½	.08½	Tallow City, extra loose.....lb.	.....	.06¾	.07¾	.06¾
.10½	.08	.10½	.09½	Edible, tierces.....lb.	.07¾	.07½	.09½	.07¾
.12	.10¾	.12½	.11½	Tallow Oil, Bbls, c-1 NY...lb.	.....	.10	.11	.10
.11	.09½	.11½	.10½	Acidless, tanks NY.....lb.	.....	.09	.10	.09
Nom.	.08	Nom.	.08	Vegetable, Coast mats.....lb.	.08	Nom.	Nom.	.08
.12	.11	.11	.....	Turkey Red, single bbls.....lb.	.11	.12	.12	.11
.16	.14	.16	.14	Double, bbls.....lb.	.14	.16	.16	.14
				Whale, bleached winter, bbls				
.80	.74	.80	.78	NY.....gal.	.....	.74	.74	.74
.82	.76	.82	.80	Extra, bleached, bbls NY..gal.	.....	.76	.76	.76
.78	.73	.78	.76	Nat. winter, bbls NY.....gal.	.....	.73	.73	.73

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"WE"—Editorially Speaking

Lauren B. Hitchcock, exponent of the chemical industry in the South, is associate professor of chemical engineering at the University of Virginia. He was educated at the Massachusetts Institute of Technology, receiving the degree of S. B. in 1920 and that of S. M. in 1926, in chemical engineering. He joined the U. S. Naval Aviation Corps in 1918; entered the U. S. Regular Army in 1921; and resigned in 1928. He was a graduate of the Field Artillery School in 1922, and army graduate student at M. I. T., 1925-26; and a member of the technical staff, Explosives Manufacturing division of the Ordnance Department, U. S. A., in 1927-28. From 1928 to date he has been a member of the faculty of the University of Virginia. He is a member of the American Chemical Society, at present acting in the capacity of chairman, industrial committee of the Virginia section; the Society for Promotion of Chemical Education; Virginia Academy of Science; Alpha Chi Sigma; Trigon; Westmoreland Club, Richmond; U. S. Reserve Officers' Association; and is Captain, Ordnance Reserve, Ammunition Division.

Dr. Walter S. Landis, who discusses the chemist from the executive viewpoint, is well known to readers of CHEMICAL MARKETS, since his contributions have appeared in our pages before. He was born in Pottstown, Pa., July 5, 1881, and was educated at Lehigh University, receiving the degree of M. E. in 1902, and that of M. S. in 1906. He was also presented with the honorary degree of Sc. D., by that university in 1922. He was a member of the university's faculty from 1902 to 1912, leaving there to become associated with the American Cyanamid Co., of which organization he is at present vice-president. He is the author of numerous contributions on electrochemistry, particularly on the subject of nitrogen fixation. He is a member and past president of the American Electrochemical Society.

William C. Weber, whose article on phosphoric acid in its role as a binder of synthetic ammonia, appears in this issue, is technical assistant to the vice-president and general sales manager of the Dorr Co. He was born in New York, November 18, 1901, and has been associated with the Dorr Co. since January 1918. He has served the company in various capacities, first at the laboratory and experimental station at Westport, Conn., and more recently in the development department in New York. He spent practically all of last year in Germany, where he made a complete study of the synthetic fertilizer situation. At present he is in charge of all of the technical work of his company in the United States relating to the Liljenroth synthetic fertilizer patents.

COMING FEATURES

ALUMINUM CHLORIDE

Dr. P. H. Groggins, senior chemist, Color and Farm Waste Division, Bureau of Chemistry and Soils, discusses this very interesting chemical in relation to its new status as a member of the heavy chemicals group.

MERCURY

Charles S. Wehrly discloses the intriguing story of the production and distribution of quicksilver.

SHELLAC

John Clarke, of Knight & Clarke, discusses the origin and manufacture of this material.

MARS

"The Chemical Industrialist"—Williams Haynes writes of the chemical developments arising out of the World War.

Harry O. Moraw, chemical marketing specialist in charge of industrial chemicals, Bureau of Foreign and Domestic Commerce, was educated at the University of Missouri, graduating in chemistry in 1914. He has been associated with the chemical division of the bureau since 1928. For eight years he was associated with the Bureau of Chemistry of the Department of Agriculture, as a chemist. He spent about two years in development work with the Swan-Myers Co., Indianapolis, and several years in sales promotion work. Among his contributions to scientific literature are included research work on development of methods for the examination of ephedrine products, methylene blue, chloroform, chloral hydrate, carbon tetrachloride, mercuric iodide in tablets, and an unpublished work on the mechanization of alkaloidal assays. In his present chemical trade promotion work his contributions include; "Resume of World Caustic Soda Trade," "International Soda Ash and Caustic Soda Trade," and "World Borax Consumption and U. S. Exports." He is a member of Alpha Chi Sigma and of the Washington section, American Chemical Society.

D. A. Wilcox, who is contributing the series on chemical cost accounting, was graduated from Columbia University in 1913 with the degree of chemical engineer. His first business connection was with the United States Rubber Co., where he was engaged in industrial research work, as assistant to the vice-president in charge of development. As captain in the quartermaster's department during the war, he organized and operated the bureau in charge of distributing the effects of all deceased members of the A. E. F. For the past twelve years he has been engaged in accounting, first as office manager of a department store in Louisville, Ky., and more recently as cost accountant for a paper manufacturing company with mills in the United States and Canada. He is the author of many technical articles on cost accounting in trade and accounting journals and has given several talks on this subject before professional societies.